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A
CATECHISM
OF
HEALTH

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A CATECHISM OF HEALTH

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LONDON: THE C. W. DANIEL COMPANY
46 Bernard Street, W.C.1

MADE AND PRINTED
IN GREAT BRITAIN

First Published 1928

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A CATECHISM OF HEALTH

BALANCE BETWEEN FUNCTIONS AND FACULTIES

Inquirer. 1.—If you were writing a Catechism of Health, and if I were to ask you for a definition of Health, what would you say ?

Medical Adviser. 1.—I should reply that human health seems to consist in a balance or due proportion between the various functions and faculties expressed throughout the human body ; a balance of its temperature or heat, of its pulse-rate, and of its respiratory rate; all of which ought not to be too high or too low, too quick or too slow; as also of its work, which ought not to be too heavy or too light, too long continued or lasting for too short a time ; and so with the other functions of the body. Indeed I might add that the rapidity or eagerness of intellectual life ought to be moderate also.

I. 2.—That seems rather vague. If I said that that seems to be rather a description than an attempt at a definition of health, what would you reply ?

M.A. 2.—Well : I should have to say that the body seems to be a machine procreated by that variety of the Life-force in general which may be called the force of Man-life, and that man-life requires a machine to be kept warmed to about 98½ deg. F., with a pulse rate of about 60 to 90 a minute and a respiratory rate of from about 12 to 20 a a minute, in order that it may be able to work efficiently for from about six to ten hours a day, at work which is suitable for it, as, e.g., lifting or carrying weights say from three to five stones, or doing intellectual or other work for the same or perhaps longer periods of time daily. There is also of course the internal work of the body as the digestive and blood-making processes, which will have to be referred to as our inquiry proceeds.

I. 3.—I seem to be somewhat confused. I thought that you would be able to define health more accurately and more shortly. You speak of the life-force in general, of which man-life is a variety. What do you mean by that ? And what has that to do with health ? Am I to understand that there is no hard and fast line to be drawn between health and disease ?

M.A. 3.—As to the latter part of your question I should say : No ; there is no hard and fast line to be drawn between health and disease. Health and disease are only contraries of one another and not contradictories. Of contraries there is a vast variety in Nature : and the definition of contraries is that they merge into one another, by gradations so insensible that it is impossible to say where one ends and the other begins. Such are long and short ; wet and dry ; warm and cold, light and dark, quick and slow, even right and wrong, material and spiritual, and many others, as well as sick and well. Of contradictories there are comparatively few examples ; but the definition of contradictories is that contradictories are contradictory of one another in all circumstances, and that there is no transitional stage between the one and the other. There is, as it were, a great gulf fixed between them, and no bridge can be thrown or found to pass from one to the other. An example of contradictories would be that either forces make things, or things make forces. Another example would be that either Life makes Organization, or Organization makes Life. And still another would be that either God makes the universe, or the universe makes God.

I. 4.—Are you sure that you are correct in your first example? It seems to be universally held that gravitation is a property of matter. Would you say that the universally held opinion is wrong, which alleges that gravitation a force is a property of matter a thing?

M.A. 4.—Yes: I see no evidence for that statement, although it does seem to be almost but not quite universally made: for I think that gravitation a force procreates matter a thing, in order that gravitation may express or declare itself to us who might otherwise fail to see that as gravitation is the most wide-spread law of physics, so drawing together or attraction ought to be the most wide-spread law of ethics and of religion and that Love is the simplest expression of that law. But to say that gravitation is a property of matter seems to me to transcend the evidence; for all that science can say on the point is that matter is always associated with gravitation and that gravitation is always associated with matter; but whether one causes the other or as I have called it procreates the other, or whether the other procreates the one, is not scientifically proved, although it is almost always unwarrantably assumed by scientific men that matter is the cause or source of gravitation. Of the two forms of idealism that force is the cause of matter or that matter is the cause of force, science seems to prefer the meaner explanation.

I. 5.—I should have thought you would have termed the former materialism and the latter idealism, and I should have thought that these two were contradictory to one another for ever?

M.A. 5.—Well of course, to call them both idealisms, but to say that the one ideal is a meaner one while the other is still an ideal but a much nobler one may perhaps be termed a form of words. But what I had in mind was that if you take as a sample of matter, say a mass of steel, and on the other hand if you take force or energy as your ultimate existence in the world in which we live, you can see that your steel mass is nothing like so persistent as it seems to be, for if you heat it, it becomes molten like a fluid; while if you heat it more it becomes white hot. If you heat it more still, it becomes incandescent, while if you heat it still more, it disappears in vapour, leaving only a few scales behind it. Some of it may indeed be recovered, but most of it is lost for ever. Energy on the other hand is always ready to procreate new forms, in which to express itself; and even if these new forms or embodiments vanish like the steel mass but more easily, one can see that the two explanations may be called different forms of idealism, but the materialistic is a much meaner one than the other. It makes a very great difference which view we take and whether we think that forces procreate things or that things procreate forces. Especially is this the case now that scientific men have given up their belief in the eternity of matter. As you know it was stated about the end of the eighteenth century by Lavoisier and others that matter was eternal, that it might change its form indeed but that it never disappears. At that time and for more than a hundred years after that time, it did not seem to make a great deal of difference in our thinking whether we assumed an eternal matter or eternal force as the source of the universe. Now, however, since science has come to the belief under the influence of Le Bon and others and at any rate since the discovery of radio-activity, that matter vanishes without return, it makes the greatest difference whether we assume that a vanishing thing like matter is the ultimate factor in the universe or an eternal power like force or energy. Our ideal in the former case would be a much meaner one than the other. Indeed a vanishing thing could not be the ultimate source of energy or of any other power. The curious thing is that humanity somehow seems to prefer the meaner explanation to the nobler one. However I do not wish to prosecute this any further at present.

I. 6.—What you say is somewhat surprising, but may I ask what has all this speculation to do with health ?

M.A. 6.—Much every way. The universe, not merely the little world in which man dwells, but the whole of the universe of which we have or can have any knowledge appears to me to be the procreation of one universal power or energy which I term pan-mono-dynamic : and bio-dynamic of which man-life is a particular form or variety appears to me like pan-mono-dynamic itself, to proceed from the only Source adequate to account for it, viz., God Himself. I cannot speak of health without keeping this view constantly in mind, or make you understand what I mean, unless I explain the sense in which I use the words. I do not of course mean to go further into this question than the inquiry compels us to do ; but I wish to say at the outset that pan-mono-dynamic or the universal energy whereby all things do consist appears to me to possess and to manifest more qualities than the infinity, omnipotence and eternity usually attributed by philosophers to it.

I. 7.—If this is interesting, it is also surprising. Will you mention any of the other qualities which pan-mono-dynamic seems to manifest ?

M.A. 7.—Well; yes, I will if you will promise not to go further into them at present, for I quite admit that we seem to have travelled far from the simple inquiry as we thought it into health with which we started. Pan-mono-dynamic then seems to me to be orderly, anticipative, just, and considerate and merciful, and to have other qualities, as may appear in due time.

EATING AND DRINKING

I. 8.—You surprise me, for I have looked on nature or what you call pan-mono-dynamic as ruthless and cruel, but, of course, I must not interrupt the inquiry into health. Would you say that any part of the inquiry into health is fundamental, or of much more importance than the rest?

M.A. 8.—Yes, I should say that nutrition or digestion, in short alimentation, or eating and drinking is far and away the most important element in the preservation or in the loss of health. In fact so much the most important is it that all the other causes of health and disease put together are not of equal importance with it. It was said, some sixty or seventy years ago that of all the causes of disease, breathing bad or vitiated air is the [illegible]ut I do not think that this is true, even if [illegible]nown, as I think it can, that the acceptance [illegible] this generalisation has been followed by very great benefit to life in reducing the mortality from what are called the specific fevers and consumption of the lungs. The term specific fevers is the name given to the feverish conditions, which mostly attack children and young people, such as measles, scarlatina, diphtheria, chicken pox, whooping cough, mumps, typhoid fever and typhus, etc. These have all been greatly reduced as causes of mortality, since the Registrar General began to keep his figures in 1838; and so also has the mortality from consumption of the lungs. Nevertheless so much more important is wrong alimentation or wrong eating and drinking as a cause of disease that it seems to me that nutrition is almost the only condition that doctors can treat: and unfortunately so widely do doctors differ in this fundamental point that the question often arises as to whether we undersand it.

I.9—Well, yes; Now you mention it, it does seem as though doctors do differ on this point, for some think that we, the public, ought to eat four or five or even six times a day, while others tell us, that we ought to eat only three times, and others still that two meals are enough; while still others advise us to eat only once a day, at least after a certain age say about 50 years.

M.A. 9.—Yes, I agree with the last advisers you mention. It seems that digestion takes a much longer time to be effected than many of us supposed. I have for example often seen food ejected from the stomach as much as 48 hours after it had been eaten; and this has been true of foods that were not irritant but simply undigested and seeming to lie in the stomach more or less inert. Take mushrooms, for example, I have several times seen this happen after they have been eaten. Of course this is a little abnormal, but still it is a much commoner condition than is usually supposed. No doubt also humanity differs in this respect as in all others. Doctors call the state by the name Bradytrophia or slow digestion, but it is commoner than is supposed. As to inequality, nothing in nature is more universal than inequality. Not only does each member of the human family differ from every other in many particulars, but even every leaf on every tree so differs, not only the oak leaf from the elm leaf, but on the same oak tree each oak leaf from every other, although it is generally quite easy to separate oak leaves from elm leaves, and so on. In other parts of nature, what we call the inorganic or sometimes call inanimate parts of nature, inequality is so marked a feature that some bodies are larger than others, some are warmer than others, some are more luminous than others and so on: and the curious thing is that the motion of nature (for nature is a going concern) is carried on in this very way or by this very means, that the warmer parts with some of its heat to the cooler body and sets it in motion; so that one sometimes asks oneself if there are any parts of nature that are inanimate, and if a better division of bodies in nature ought not rather to be into more animate and less animate, more living and less living, than into animate and inanimate or into living and dead. I spoke of leaves and how different they are. Well, but look at monkeys or dogs: they differ so enormously from one another that the great Dane and the toy terrier might almost belong to different classes of animals: and yet they all seem to recognise each other as dogs, although we can hardly suppose that they know that they know it. This by the way is one of the early puzzles which present themselves to us for solution, for we often have to ask ourselves if knowing and knowing that we know are the same. As all things and creatures vary very much so do human beings, for they vary in height from say 8ft. or more to 5ft. or 4½ft. or less: and as they differ so much in height and also in weight so do they seem to differ very much also in the time required for digestion, some requiring apparently from two to three hours, while others require six or eight or even more for the same process. A great divergence from the average condition of humanity is not apparently conducive to health and longevity. For it is well known that neither giants nor dwarfs live long as a rule, although variations are so wide that it is often very difficult to say what the average is.

THE NO-BREAKFAST PLAN

I. 10.—Is it true that you recommend what is called the no-breakfast plan ?

M.A. 10.—Yes : but what I recommend would be more fitly termed the postponement-of-breakfast plan, than a no-breakfast plan, because when we take food for the first time on any day we break our fast on that day, and if we took no breakfast at all, we should never eat, and would no doubt die of starvation after some weeks. What I do recommend is postponement of breakfast till 12 or 1 o'clock.

I. 11.—But is not this advice contrary to nature, or at least contrary to general if not universal custom ?

M.A. 11.—It is certainly opposed to general custom in this country at present, but I think that its introduction would be a means of making life longer, healthier, more efficient and happier than it is now.

I. 12.—That sounds strange to me. I should have thought that anyone who started a morning's work without breakfast would feel faint and empty : and I think that I should have a headache if I did so.

M.A. 12.—Yes : you would or might the first day or two ; but in a few days you would get over the empty and unfit feeling : and in a few weeks you would probably not be willing to go back to the ordinary plan of early breakfasting, because you would feel hot and uncomfortable if you did : whereas without it or with only a hot drink of say barley water or of tea or coffee or cocoa you would feel much fitter for your work whatever it is.

I. 13.—But why do you recommend this plan? On what physiological or natural grounds?

M.A. 13.—Mainly on this ground. The night and the forenoon are the times during which the bodily processes are engaged in throwing out or eliminating as it is often called, waste matters from the blood. This is evident if we reflect that the first thing we do on waking is to empty the bladder of what has been accummulated in it in sleep: also that the bowels move usually in the early part of the day; and we might also reflect that in the deep breathing of sleep CO_2 and other gaseous waste products are expelled from the body, and probably to a fuller extent than during waking hours. Sleep in fact restores the body by eliminating the waste matters from the blood and even from the tissues, although a much longer time is usually required to empty the connective tissues than the waste receptacles of the body such as the bladder and large intestine which have been filling during sleep. Besides this, consider the behaviour of the lymph in the connective tissues. Like that of the blood in the body in general, it is always circulating both when we sleep and when we wake and do things or work. In fact one of the functions of the connective tissues is to act as the dumping ground of the blood: so that whenever the blood contains in it more material than is necessary for the restoration of the waste of the body, the surplus is laid down or dumped down in the connective tissues of the body. It is surprising also for how long a time this collection of waste matter in the connective tissues of the body may persist. I have experiences which make me believe that they may be dumped there for weeks and months, because I have known a large quantity of amorphous urates come away by the kidneys even after a fast that had lasted for 28 days. Obviously that waste stuff must have lain in the connective tissues all that time at least. When I saw this for the first time I was greatly surprised.

I. 14.—Why were you surprised when you saw those amorphous urates ?

M.A. 14.—You may well ask. I had assumed without sufficient evidence and even without realising what I was doing, that the processes of the body were much more quickly performed than is really the case. This no doubt was a wrong preconception of mine, but it accounts for my surprise and tends to make me realise how little I know of the working of the body about whose management it is my function to advise my fellowmen.

I. 15.—You spoke of the connective tissues having a double function of connecting every part with every other, and of acting as the dumping ground of the blood ?

M.A. 15.—Yes : most or at least many bodily structures and organs seem to have a double function. Thus the lungs take in oxygen and liberate or expel CO_2 and other gases. Secreting organs like the liver receive or take in venous blood and remove from it bile. The skin forms the covering of the body, but it also acts as an excretory organ for getting rid of water and other waste matters. That is, most, if not all organs, both take in and throw out, or rather act as a means of taking in and of throwing out, acting in the one case centripetally and in the other centrifugally. It is also a question if these two actions are not always going on simultaneously in the same way as for instance an electric current seems to pass sometimes in both directions along a wire at one and the same time.

I. 16. That seems surprising if not confusing.

M.A. 16.—Yes, although in some ways the body seems simple, in others it seems to be intricate and surprising and perhaps even confusing and difficult to understand.

I. 17.—I have heard, doctor, that some critic of yours has called you a very ignorant man.

M.A. 17.—Yes, he did: and I winced under the accusation; but on reflection I felt that it was true and that the sooner I set about rectifying my ignorance the better. Strangely enough I doubted if the critic was right in attributing ignorance to me on the particular point on which he attacked me, for I thought and still think that micro-organisms or germs as they are often called, do alter their appearances and shapes during growth and development, and that they may appear as spores or rounded cocci or as comma-shaped, or may throw out little rods or bacilli, and that cells may be round or oval, and that in fact even if a micro-organism shows on the whole similar characters in accordance with its species or genus, the characters or shapes may be so altered by circumstances that even experts may be deceived. But although the particular accusation does not seem to me to be just, still I know that I cannot rebut an accusation of ignorance in general; nor did I know if my critic himself was omniscient. Still when I came to think about the matter I had to admit that my reason for enquiring was because I was and am ignorant, and because I wanted and want to know. It is even a frequently recurring reflection how little any of us knows, even about the things on which it is our function to advise others; or at least how little I know.

I. 18.—Then I suppose you would say as to the no-breakfast plan, or the postponement-of-breakfast plan, that as nature is engaged in eliminating or throwing out waste matters from the blood and tissues during the night and early part of the day, you think it unwise to trouble her with the labour of digestion and assimilation during the eliminating time ?

M.A. 18.—Yes : that is my view, and do you not think it reasonable that we should refrain from throwing on the body the double work of absorbing and eliminating, of taking in and throwing out at one and the same time ?

I. 19.—Yes, it seems so to me now ; but I confess I had not thought of it in that way before.

M.A. 19.—No. I suppose you have looked on nature as reckless and ruthless and indifferent as to happiness and life and health, whereas she seems really to be working for health and happiness all the time !

I. 20.—Well ; now you put it that way it seems to me that you are right. How would you put in a sentence your view as to the desirability of introducing the no-breakfast plan, or as you prefer to call it the postponement-of-breakfast plan?

M.A. 20.—Well, I should say that in order to avoid double labour to the organism it is well to wait till say 12 or 1 o'clock in the day before taking anything to eat.

I. 21.—What about a hot drink ?

M.A. 21.—I think that stimulates the bodily processes to do even better what in any case they are preparing to do without it ; and so the eliminating processes go on better. As, further, the drink requires very little labour to assimilate it, the bodily powers can be more effectively directed to the getting rid of waste matters and so to preventing the onset of disease which is so likely to arise from the retention and slow and insidious increase of such waste matters. There is another reason also, namely, that the forenoon is the best time for work. Work may in a sense be described as an eliminative process, just as parturition is an expulsive process, for in both cases something is done, not so much for the conscious benefit of the individual performing the work or through whom it is done, as for the benefit of the race to which he or she belongs, and even perhaps for the benefit of other races of beings beyond our ken.

TWO MEALS A DAY

I. 22.—What hours would you propose for taking the two meals ?

M.A. 22.—I should propose 12 noon and say 7 p.m. ; or perhaps what I should prefer would be to breakfast at say 9 or 10 a.m. and to dine at say 5 p.m. when work would generally be over for the day.

I. 23.—Would you then propose that we should eat nothing at all from 5 p.m. till 9 or 10 a.m. next day ? Is not that a very long time to go without food and should we not be faint if we did so ?

M.A. 23.—I do not think so. But I am obliged to ask you to wait till we have considered some other points, after which we shall be better able to consider the proper answer to this part of your question.

I. 24.—You seem to have offered better reasons for the no-breakfast plan than I thought possible. Now let me ask you how much food do you think that the body requires in a day ?

M.A. 24.—I think from about an ounce to an ounce and a half a day is required for every ten pounds of body weight. A man weighing 140 pounds avoirdupois weight would require from 14 to say 20 ounces of food daily as it comes to the table : And a 12 st. man from a pound to a pound and half of food a day.

I. 25.—But food varies very much in kind and quality. Would you say that 21 ounces of lettuces or of celery or of bread or of meat would meet the requirements of the body ?

M.A. 25.—Certainly not. Nature it so happens has provided for the human family a great variety of foods. At no time except in the first year of life does she suggest to us that we should live on one sort of food only : and in this case she does her work so efficiently that in the first year of life babies grow at a greater rate (at least when humanity is normal) than at any other time of life. At all other periods of life nature offers us a very large variety of food, and a natural if silent suggestion seems obvious that we should gratefully accept what she so generously provides. If indeed it is true that nature has been evolving our bodies over an unknown number of generations, it should be remembered that she has been simultaneously evolving the food suitable for us, and therefore it seems that we should gratefully accept her gifts in the variety with which she has provided us with them.

I. 26.—Do you then think that we ought to accept the good things of life freely ?

M.A. 26.—Well, yes gratefully, but with moderation, because if we do not put some restriction on our appetites we shall not make ourselves efficient for the business of life. There is far more danger from the inefficiency which comes from excess, than there is from the inefficiency which comes from too little. It is the latter no doubt, just as it is poverty, that we fear. But in fact we far oftener block our bodies by taking too much food than starve them by taking too little. Of course I do not mean that I think we ought to take less than enough : but I do mean that I think that there is far more danger that most of us will take too much than that we will take too little food: and I also mean (if unwillingly) to say that unless we begin with some amount of self-restraint and self-government we cannot have good health.

I. 27.—You do seem to be a very unpleasant or shall I say uncomfortable adviser?

M.A. 27.—No: I only mean that health can be maintained only by finding out what are the laws of life and by our trying to obey them. I also mean that this is a far better way of trying to attain health than any other, for it seems to me that it is true of health as of another form of life, that he that seeketh health shall lose it, while by striving to discover and obey the laws of life he may and probably will find it.

I. 28.—Then there is no certainty?

M.A. 28.—Well: I do not know. I have sometimes wondered if perfect health is attainable in present circumstances? but I feel sure that it is not attainable by direct effort but only by submitting to the conditions. Perhaps after three or four generations of endeavour to obey the law perfect health might be or will be attainable?

I. 29.—Then am I to understand that you recommend human beings to start the day on nothing but a hot drink of barley water, or water, or tea, or coffee or cocoa?

M.A. 29.—Yes.

I. 30.—Why?

M.A. 30.—I have been trying to explain why; but if I must repeat I should say, because as the bodily machine is engaged in throwing out waste matter or in doing work, or in both of these processes at once, it does not seem to be wise or physiological to compel it to be doing internal digestive work at the same time.

I. 31.—I suppose you would admit that the body must waste a little in doing the morning's work? What provision do you propose for the restoration of this waste?

M.A. 31.—The working of the body does not depend on the observer of that work; and it so happens that not I but nature herself has already made quite ample and indeed I think also rather wonderful provision for that purpose; for among other provisions she has stored in the liver and in the muscles a material called glycogen whose slow oxydation liberates heat and so keeps up the bodily temperature, as if the life-force knew that unless the bodily temperature is maintained at about 98½ deg. F. or about 37 deg. C. the body does not serve as an efficient instrument for the output of work.

I. 32.—Well, when I asked what provision do you propose to make I did not quite mean that, for of course I knew that provision must be made by the life-force itself for the restoration of the waste of the body and also for the maintenance of its heat. What I meant was rather this: As the bodily machine wastes as you say when the life-force acts through it how is that waste made good?

M.A. 32.—By the food, of course: but the answer will be made all in good time. The machine can go on for a considerable length of time working: and then it requires some time to rest, and also must have time and opportunity for taking in material to maintain the bulk or size of the body so that it shall remain an efficient machine for doing work.

I. 33.—Then you would propose to breakfast from 12 to 1 o'clock?

M.A. 33.—Yes: And I prefer 12 noon to 1 p.m. because I wish to have a good long interval between the first and second meals of the day, and as that interval ought not be less than 7 or 8 hours I am anxious to find time for the digestion of the second meal of the day before the person goes to sleep say at 10 or 11.

I. 34.—Do you think then that digestion requires 7 or 8 hours to be effected ?

M.A. 34.—Yes : Not however the primary digestion only, for I think that that is performed in 3 or 4 hours or 5, but I am anxious to find time for the secondary digestion through the action of the lymph-circulation, and that requires some hours more.

LYMPH CIRCULATION

I. 35.—Lymph, Doctor ? what do you mean by lymph ?

M.A.35.—If you prick your finger and if you watch what happens you will find that round the drop or two of red blood caused to flow by the prick there appears a clearer yellow or straw coloured part. That is the lymph. You may remember a line in Horace which says :

> " *Ora manusque tua lavimus Feronia Lympha.*"
> " We wash our faces and hands, Feronia, in thy clear pool."

The Romans took that word from the Greeks and often used it in poetry when they required a less prosaic word than *aqua* for water. And lymph is probably connected with λῦμα which means dirt or filth, as it was thought that this lyma was washed away by the clean, more watery, and cleansing part of the blood—an excellent thought which it is much to be wished we had kept more persistently in mind, since the function of the lymphatic spaces in the connective tissues, of the lymph ducts which arise by joining the spaces with one another, and of the lymphatic glands which elaborate the lymph and make it more corpuscular before it joins the thoracic duct—the functions of all these constituents are to cleanse and purify the body and keep it fit for the purposes for which it is suitable and for which therefore it was probably intended.

I. 36.—You confuse me. I had no idea that there was any such elaborate system in the human or animal body as this lymphatic "circulation"—would you call it so?

M.A. 36.—Yes, it is confusing no doubt but the confusion is in the observer I think, not in the process itself. It is simple enough when you see the meaning of it, or some of its meaning I ought to say; for inquiry into nature constantly rewards her votaries with new revelations whose meaning is never clear at first sight, though inquiry always illuminates the more those who go on inquiring as to the meaning of things. I think that it must have been to primitive man that the earth appeared without form and void: but the spirit of God moving on the face of the deep had no sense of formlessness, but on the contrary knew from the beginning, or what appears to us to be such, both what the form meant, means and will for ever mean: since really as things never began so they shall never cease to be, great as is the ignorance of the observer, and greatly as he is and must continue to be, if not overwhelmed by ignorance, at least compelled to wonder as the meanings of things gradually disclose themselves to his inquiry.

I. 37.—You spoke of a "circulation" of the lymph?

M.A. 37.—Well, it is a circulation though not demonstrable so easily or to the same voluminous extent as that of the blood. And yet some physiologists say that there is twice as much lymph in the body as there is of blood. Others again say that so much lymph as that is pathological or a mark of disease: and this opinion if you think of it, shows again how there is no hard and fast line between health and disease, between physiology and pathology, which thus appear to be not contradictory to one another but contraries only. However there are no large vessels to convey the lymph like the aorta or pulmonary artery or like the large veins which convey the blood current all over the body. The largest lymphatic duct is not so big as a sparrow-quill where it joins the thoracic duct, so that the lymph-circulation might perhaps better be described as a general oozing, or percolation than a circulation. The process however is full of interest and ought to be more studied than it has been, for some animals actually have lymph-hearts to pump the lymph; and also it is said that there is no lymph-circulation in invertebrate animals.

I. 38.—Why do you say so much about the lymph?

M.A. 38.—Because the large class of neuralgic and rheumatic and gouty diseases depend on disturbance of the lymph-circulation: and these count for much in our study of health and disease: and also because lymph-congestion or stasis as it is sometimes called, enters as an important factor into many if indeed not into all diseases.

I. 39.—Then lymph and lymph-circulation are much more important than I had any idea of. Is that what you mean?

M.A. 39.—Yes that is part of what I mean. Rather elaborate provision has been made by the force of man-life for the preparation of the lymph. First of all as we have seen, lymph is separated from the blood in the connective tissues of the body. These connective tissues are so called because they connect every part of the body with every other, and they form what are vulgarly called guiders and tendons and membranes and the coverings of bones, muscles and nerves, and they form also the ligaments of joints. They are ubiquitous in the body and form also the coverings of viscera like the lungs, liver, stomach and intestines. Now not only is this so, but wherever these tissues are found, there also lymph or watery fluid containing semi-solid material is separated from the blood. All the fluids of the body are " thicker than water." This tends to accumulate in the connective tissues and to congest and stiffen them until it is removed. Consequently, and as nature always seems to work for the advancement and furtherance of life, the lymph percolates from the connective tissues and finds its way by means of the performance of the movements always going on in the body, to glands which lie in the neck, and arm-pits, and in the groins, and other internal parts, to all of which the lymph is conveyed from the areas in their proximity. After the lymph has passed through these glands, it is found to be less watery and more corpuscular, that is, it contains more little bodies which can be seen under the microscope, and by their formation the lymph is made more fit to be carried to its destination, which is to join the thoracic duct. Now the thoracic duct contains the products of the digestion of the food, after that has been acted on by the teeth, mouth, gullet, stomach, small intestines, liver and pancreas, etc.

The thoracic duct's function therefore is to convey the digested foods into the blood which it does at the root of the neck on the left side. Before they are poured thus into the large vein, the thoracic duct receives, as a river does its tributary, the contents of the lymph-circulation or percolation. Could any demonstration be clearer than this silent declaration by the life-force that the intention is that nothing shall be lost ? And also that as man-life seems to have foreknown that waste-matters would be accumulated in the connective tissues of the body, she proceeded to arrange to meet the difficulties which would arise? If she did not or does not know, she seems to act as if she did or does.

FATIGUE, BRUISES, ETC., AND LYMPH CONGESTION

I. 40.—It just occurs to me that perhaps the reason why many persons feel tired may be that the connective tissues which you say form membranes and muscle-sheaths and nerve-coverings may be blocked by too much lymph, setting up a kind of lymph-stasis as it may be called? What do you think of this idea that just strikes me? Perhaps you intended to make me think of such a suggestion?

M.A. 40.—I am very glad that you have asked the question for it is a most important one, and I think your suggestion is right. The subject is really a very wide one because the whole class of rheumatic and gouty conditions as well as many others depend on lymph-stasis; but no doubt you are right in suggesting that fatigue and these rheumatic states are closely allied and are all due primarily to lymph-congestion. In fact so common are these conditions that it seems to me as though the medical profession has come to believe (through not thinking enough about them, I imagine) that the tender places found in so many people and the facility with which many of us bruise and become black and blue through very slight injuries, are more or less natural. And so we actually describe as marks of health (so common are they) what are really signs of beginning rheumatism and other diseases. You may have observed that sometimes at meetings of young people, it is considered amusing if the firm grasping of an arm causes flinching and if it causes black and blue marks the next day or the day after that! Well, it is not really amusing at all, but is a somewhat serious thing, if a young woman, e.g. shows bruises on her arms from causes so slight as that. It is a common enough condition no doubt, so common that we seem to consider it natural or healthy, while in fact it is not so, but is really a sign of commencing disease which ought to be dealt with by diet and exercises. I will not enlarge on the subject, but may say that when such things happen, the connective tissues of the person concerned are in a very friable condition, comparable with the state of a sheet of wet brown paper, which as you know ruptures under the smallest amount of tension. When the connective tissues rupture, the finest blood vessels as well as the lymph-vessels are also ruptured because they accompany the strands of the connective tissues. Fine bleeding then takes place under the skin, forming the black and blue marks, which afford so much thoughtless amusement, though there is often further opportunity of thinking upon their significance in later life, when perhaps hysteria and neurasthenia and a succession of indefinite illnesses have to be coped with, often in a very sad way and very trying to all concerned.

A further important consideration should be borne in mind, viz., that sometimes designing persons have paraded such marks as proofs of cruelty; and judges and juries not knowing how easily such marks are caused, have been misled into giving unjust verdicts in courts of law. You have asked a most important question. You can see how very serious such conditions may be if such friability of connective tissues may render even breathing impossible without rupture of fine vessels about the trunk or inside the body, and also how serious such states inside the head may be and how easily slight or severe rupture of vessels happening there may induce attacks of apoplexy.

I. 41.—Then the body is really a more complicated and intricate machine than one supposed ?

M.A. 41.—Yes, that is what I think.

CUSTOM VERSUS EXPERIENCE

I. 42.—The suggestion temporarily interrupted by these considerations regarding the lymph, that we should take two meals a day only is very interesting: but do you not think you are suggesting something unusual and even incompatible with common experience and custom among human beings ? Surely you must admit that custom carries with it at least a prima facie case for believing that the custom is in conformity with the real needs of humanity ?

M.A. 42.—Yes, I do: But if you will inquire further and particularly if you will put the plan into practice you will find it will work out well. I frankly admit to you that when the plan of two meals a day or dissiteism, as it is sometimes called, was first suggested to me, I thought that I had never heard of any proposition so foolish as that ; but experience soon showed me that I was wrong.

I. 43.—Then you have tried the plan ? For how long ?

M.A. 43.—Yes. From thirty to forty years.

I. 44.—Has anyone else followed the plan successfully ?

M.A. 44.—Oh yes, a great many persons.

I. 45.—And have the results been satisfactory ?

M.A. 45.—Very satisfactory : that is, the practice has led to good health, greater efficiency for work and fewer illnesses; and also (although you would hardly think this) to better growth and development of the body.

I. 46.—You surprise me.

M.A. 46.—Yes, I admit that it is surprising; that is, the experience seems to conflict with a much more widespread custom.

I. 47.—You have already admitted that the customs of mankind will on the whole be found to conduce to health ?

M.A. 47.—Yes. But it is well to examine customs in order to see whether they are as conformable to health as they might be. Customs may have begun in ignorance and may have been continued because they did not plainly seem to damage health, and because we did not want to be disturbed by being made to think about them and their effects. But if we do not examine things do we not run the risk of unimprovement ? or of not progressing ?

I. 48.—Are you the introducer of this suggestion, Doctor ?

M.A. 48.—No. It was Doctor Dewey of Meadville, Pennsylvania, who made the proposal in its modern form, for among the Greeks and Romans exceptional persons ate only once a day, were monositeous as it was called (μόνος alone and σιτεῖν to eat) —although the word sometimes meant eating alone; and some were dissiteous and ate twice a day. The latter is the proposal I suggest for general acceptance, although in advanced life I think that once a day eating is better than eating twice: or if twice, then exceedingly little should be taken at the second meal.

NATURAL CONSEQUENCES AND HUMAN COMPULSION

I. 49.—You surprise me : but perhaps you are an exceptional person, Doctor ? and what is good for you might not be so for other people ?

M.A. 49.—I am sorry if I surprise you, but my experience both for myself and for other people when they will carry it out (but they often refuse), is that it works out well in practice, perhaps after a preliminary illness or two. However, these are easily explicable : for when the body, having for long accumulated waste matters in it from the digestion, is put on a more suitable regime, it begins by throwing out the waste and thus causes the little illnesses or the succession of them. We become impatient perhaps, and say that the plan does not suit us. As to your suggestion that I am exceptional; no, I do not think so. If there is any difference in me from my fellows, it may perhaps be that I have a little more desire to know the truth than some others and possibly a little less refusal to accept the verdict of nature when it is against me ? I hardly dare to suggest this. Of course any proposal I make is persuasive only. I have no sympathy whatever with the use of forceful or compulsory methods in matters of opinion. Even when we are thorouhgly convinced and feel sure that we can prove by evidence that our views are correct and that, if adopted, their effects would be for the general health, I think that it is much better to state the proposals and the evidence adducible for them and then to leave the conclusion as to conduct to the judgment and conscience of each. The evidence which has convinced us will probably convince at least some others and induce them to do likewise. But if not it is a question for them to settle. None of us knows very much. Much even of what we know or think that we know is not sure or certain to other people, although it may be so for us. For this reason compulsion seems to me for ever barred: for nature if we come to think of it lets the consequence of our actions fall upon us. She does not prevent us from disobeying her laws; she only visits on us or others bound up with us the consequences of our errors, and that this is just will be apparent if we reflect that the consequences of good conduct fall not only on those who do the good but on others connected with them with no merit of theirs. We do not often hear of children grumbling because through distinguished ancestors they have reaped unmerited gain; although we hear unrestrained complaints when children suffer from the faults or crimes of their ancestors. We might reflect however that the one condition is no more just or unjust than the other, and that the suggestion of nature plainly is that the effects of good are good to all generations while the effects of evil are evil to all generations likewise. These and the like considerations seem to me for ever to bar the use of force in matters of opinion. Besides that it is well known that coercion is always accompanied by and even induces resistance and evasion and almost always fails of its purpose.

My definition of ' good ' would be that it is that which benefits noble life; and of ' evil,' that it is what damages noble life.

INFECTIOUS DISEASES AND OFFICIAL PERSECUTIONS

I. 50. Would you then allow people to go about freely when suffering from measles or scarlatina or smallpox, and so endanger the public health?

M.A. 50. No. I should appeal to them or to their guardians in the case of children, to say if their conscience or judgment allowed them to do so. Very few if any would persist ; and public prejudice or public opinion would be so strong against their conduct that they would find that they could not continue. But at the same time if others were infected by them I should be obliged to ask if to some extent the victims were not guilty of contributory negligence, since if they had lived properly they would have probably made themselves immune or insusceptible to the scarlatina, the mumps, the measles or the smallpox, from which they suffered, and that they were really themselves to blame for being attacked or infected. I think that we could rely on public opinion to oppose any practice of carrying infection and to refuse to allow it, even although we felt (as I do) that to some extent we are to blame ourselves if we are susceptible to infectious disease.

I. 51. I am afraid that this is a counsel of perfection Doctor ?

M.A. 51. Well, perhaps. But on the other hand it always seems to me a very high-handed proceeding when I hear of a child being torn from its mother's arms because for example it has mumps or scarlatina, while the mother is anxious to nurse the child herself and is willing to do anything she is advised to do to prevent infection spreading, short of parting with her child. And when in addition one further reflects that the mother with perhaps 3 or 4 or 5 pounds a week is forced to do this by an official getting 30 or 40 pounds a week to which she out of her comparative poverty is compelled to contribute, well, the proceedings seem to me to be cruel or inhuman or at least inhumane. Even if I approve of the advice I disapprove indignantly at the high-handed way in which it is carried out.

I. 52. You do not seem to think that there is much danger of infection ? Or is it that you think that the danger is exaggerated ?

M.A. 52. Well, I think that if people lived properly they would not take infectious diseases, and if they do get them they have to some extent brought them on themselves by not making themselves immune to infectious disease by living properly when they had the opportunity to do so.

I. 53. Would you be in favour of fining those who could be proved to spread infectious disease ?

M.A. 53. Of course, if a wrong and damage are proved it seems fair to make the wrongdoer pay for the damage done ; but my difficulty is that it seems to me very difficult to prove the wrong, since both parties appear to be to blame when disease is caught : and I do not even know which of the two is more to blame ; nor have I always felt satisfied that justice has been done when (to take a slightly different case) an employé has done damage to someone contrary to his employer's orders, and yet the employer has been held liable, often enough for no reason I could see, except that the employer was supposed to be able to pay while the employé who disobeyed his employer's orders was not.

I. 54. How much blame do you think attaches to the infector and how much to the victim who is attacked by infectious disease ?

M.A. 54. I should say that at the very least there was an even distribution of blame in such cases ; but my own view is that if the causes are say four, then I think that three out of the four are due to the victim's contributory negligence or to the guardian's negligence in the case of children, and, say, one to the alleged wrong doer.

I. 55. Do you really think so ?

M.A. 55. Yes I do : and I repeat my reflection about the bad form of the higher paid official's inflecting penalties on the poor mainly because they are poor, especially in view of the notorious changeability of medical opinion.

I. 56. You think, then, that the danger of taking infectious diseases is greatly exaggerated and that when the danger becomes actual those who catch infection as it is called are more to blame than are those who are said to cause it ?

M.A. 56. Yes, that is my view.

I. 57. But suppose that other advisers take a different view, what then ?

M.A. 57. Well, I should ask on what grounds of justice do they carry their difference of views so far as to fine and otherwise persecute those who venture to disagree with them ? Is it right or just that they should have such power ? or that parliament or the law should allow it ? They are not infallible and may be wrong.

DO GERMS CAUSE DISEASES ?

I. 58. Tell me for I seem to be getting confused with our talk —I have heard that germs or micro-organisms cause certain diseases like diphtheria, and also that consumption of the lungs is caused by a germ. From what you say am I to gather that you do not believe this ?

M.A. 58. No I do not. I believe of course because it has been proved that micro-organisms accompany the course of certain diseases : but it is a very different thing to say that the germs cause the diseases. Before this could be admitted it would have to be shown that the germs invariably appear in the course of the diseases. Now it is admitted that they do not ; that is that in some cases, say in consumption of the lungs, it is impossible to demonstrate the presence of the special Tuberculosis Bacillus, or T.B. as it is often written. In some cases particularly of rapid or galloping consumption, the presence of T.B., cannot be demonstrated. It seems to me as if there was not time for it to be formed, so rapid is the course of the disease : and therefore I think that it is going beyond the evidence to define something as a cause when the alleged cause is not always present or when at least we cannot show that it is present. It seems to me that the presence of the micro-organism is a good fact on which to base our classification of disease, but that it is going beyond the evidence to say that it is the cause of the disease.

I. 59. Then how would you state your view ?

M.A. 59. I should say the presence of the disease and the presence of the micro-organism (when or if it is present) may be and often are concomitant* effects of a common cause, and I should add that that cause is most commonly malnutrition, in plain words wrong eating and drinking. In fact it seems to me that man-life as it works always for the benefit

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* In scientific inquiries the tendency, nay the custom, is to use very long words. For example we speak of succession and precession and consequence and use long expressions like the long precessions and successions of events. There are good English words such as before and after which might be used. For instance we might say, but we never do, the *befores* and the *afters*, while we always speak of the precessions and successions or the antecedents and consequents. Why should it be left to the poets to speak of looking before and after, or acting before and after ; and why might not scientific men introduce the use of these good English words especially as they are much shorter than the ones they use ? To explain happening together we use such an expression as simultaneous appearance while we might, only we do not, say at once happenings, or we might speak of them as the *atonces*. In many of these ways, much simplification might be introduced in the scientific expressions, and in a little time they might be expected to become understanded of the people.

and improvement of life introduces, if unawarely, the T. B., for the purpose of eating up the waste matters whose accumulation in the body is the true cause of the disease. We ought therefore to view it as a friend which arrives on the scene in order to reduce our troubles instead of as an enemy to cause them.

I. 60. Then you think that the T.B. may be looked on as what may be called a phagocyte or waste-eater whose function is to eat up the cause of our disease ?

M.A. 60. Yes that is my view.

I. 61. Of course you are aware that other medical advisers take a different view. Would you say that they are wrong ?

M.A. 61. Well that is going a long way. They are wrong in my judgment of course, but then I recognise that I am not infallible. Perhaps however, they are not infallible either ? And if they are not, why do they fine and persecute me and my like for not agreeing with them when they may be wrong themselves ? And if parliament has given them this authority, has parliament acted wisely or justly in so doing ? And ought a free people to allow such legislation to pass or to fail to repeal it if it has been already passed ?

I. 62. You have made out a stronger case than I thought possible against legislation in matters of opinion. May I ask how you would define your position in reference to the general question of the germ-theory of disease ?

M.A. 62. I should say that there appear to me to be three possible explanations, when two things, germs and diseases, are always associated with one another (in this case the two things are not invariably found together, but for the moment I propose to ignore that and to assume that they are). Well *then if two things, germs and diseases are always found together or to be concomitant* as we often express it, there are three possible explanations. Either first, the micro-organisms cause the disease (which is the usual explanation). Or second the disease causes the introduction of the germs (for the friendly if unaware purpose I suggest—of acting as phagocytes to the pabulum of the disease) and this is quite as likely a suggestion as the first. Or third the presence of the micro-organisms and of the disease are concomitant effects of a common cause, viz., in the majority of cases mal-nutrition.

I. 63. This sounds reasonable. Does any other explanation occur to you ?

M.A. 63. No, but if it does, or if you can suggest one, I am ready to consider it. None occurs to me. But it does occur to me to ask again why I should be fined for not agreeing with official views which are enforced not because they have been proved to be true, but because they are official.

I. 64. Your views about germs interest me very much. You do not seem to attach so much importance to the presence of germs or micro-organisms as is generally done ?

M.A. 64. No ; I do not.

I. 65. But why ? You have already admitted that having seen germs or micro-organisms under the microscope, you know that they exist.

M.A. 65. Of course they exist ; but they are very numerous, there being hundreds, if not thousands, not only of different individuals of them, but of different species, while new ones are so constantly being discovered that a book or author is no sooner established as an authority on them than he or it almost immediately becomes antiquated. Someone has described a specialist as a person who knows more and more about less and less ; and certainly the numbers of the protozoa that are known to exist are so numerous that they seem to be infinite or least indefinite in number. Besides, who can be sure when he has one of these forms under the microscope that that form is invariable and a true species which as it were always breeds true ? Is it not far more likely that these low forms of vegetable or animal life go through many varieties of form shape and appearance according to the circumstances in which they are, so that to ferret out all their varieties of form becomes the work of a lifetime or even of several lifetimes ?

I. 66. Well, what do you mean to suggest by advancing these considerations ?

M.A. 66. Well, this. If it is so difficult to be sure that we know all the life-history of any germ or micro-organism is it not very dangerous to deprive of liberty an individual or person who may be unfortunate enough to be suffering in his own person or in that of some member of his family from the presence of such an organism, simply because a bacteriologist has found it ?

I. 67. What do you mean ? Can you give me an instance of what you are pointing to ?

M.A. 67. Yes, many. Here is one. A lady, wife of a man engaged in the grocery business has a sore throat. A swab is sent by the doctor to a bacteriologist, who sends back a report that a paratyphoid germ is present, and that a certain test known as the Widal test has been applied and has been found positive. The doctor thereupon consults the Medical Officer of Health, and he and the attending practitioner declare that the sick woman is in such a state as to be a likely source of infection, and they therefore say that precautions should be taken to prevent the patient from spreading the disease.

I 68. Well? And would you not agree that that was a reasonable opinion to offer?

M.A. 68. Yes, I should, and I should not, of course, object to taking all reasonable precautions with that object in view. I should not object if the M.O.H. provided a special vessel or tub for the reception of excreta from the patient. I should not object, of course, to use that vessel and to do what the Health Authority recommended to be done in the public interest. I know, however, or am very sure that, while it is quite right to be careful of the public interest, the danger of infection spreading from that source is very slight, and that other persons would be infected only by such prolonged contact as would occur, say, from occupying the same bed as the patient, or by other close contact of that sort; while mere going into or out of the room occupied by such a person would not be dangerous or hardly dangerous at all.

I. 69. True, perhaps; but would you not say that it is well to err on the side of safety when the public health is concerned?

M.A. 69. Yes, of course I should; but it would depend altogether on how far the Health Authorities carried their interference. Suppose, e.g., that they recommended that the shop should be closed during the illness. I could not approve of so high-handed a course of procedure, especially as they had not shown beyond doubt that the danger of spreading the affection was so great that nothing short of closing the business for the time being would meet the case. I know from experience that the danger of infecting tinned fruits or jam from such a source is negligible; and I also know that it is almost absurd to suggest that tea or sugar one or two flats below is likely to be infected by a patient at the top of the house who may have developed a para-typhoid germ whose very existence was not suspected, say, till the end of last century, and which may have begun to be spoken or thought of under different names about the year 1900, but which only came into prominence during the war of 1914-1918. At that time the order went forth for preventive inoculation, so that the soldiers might not get typhoid fever. Just imagine the state of mind of officials who could seriously believe that because men have been inoculated against typhoid fever, they might drink foul water or eat poisoned food and not get typhoid fever ! ! Are these the sort of minds to whom we should be ready to entrust the lives of our relatives or the interests of our own business ? However, if after such inoculation patients were diagnosed to have typhoid fever the Army Authorities are said to have ordered the case to be entered as para-typhoid. I heard this from an army doctor who saw many of these cases during the war.

I. 70. Well, that is curious. Do you think that your informant was trustworthy ?

M.A. 70. Yes ; I know that he has no animus against the Army Authorities and I know him otherwise to be a simple searcher after the truth.

I. 71. But he might have been mistaken ?

M.A. 71. Of course he might ; but observe he was not recommending forcible interference with family life or with business life. He was merely stating his opinion about the usual course of such cases. But don't you see that the Health Authorities might be mistaken likewise ? And that in ordering the closing of the man's business they may have been trading on the scare of infection which they have themselves set up and probably greatly exaggerated (I don't say purposely) and because a man had the misfortune to have his wife suffering from a poisoned throat (from which by the way she made a perfect recovery) the same Health Authorities took a step which nearly ruined the man at the time when he was already suffering from the distress as well as cost of his wife's illness. I doubt more and more the wisdom of Parliament in handing such power over to the doctors and Health Officers; especially when I know that human nature is such that even officials sometimes conceive animus against citizens, and so are tempted to strain the authority with which they have been invested. When I hear of persons being interned for years because they *may* be carriers of this or that infectious germ, although to all appearance themselves quite well, I am apt to feel indignant at such interference with liberty, and more and more do I doubt the wisdom of the legislatures which invest erring men with such powers over their fellows.* Consideration of the whole question confirms me in the conviction that in matters of opinion it is always very dangerous to the public interest to use coercive measures, and that the only safe course is persuasion. Legislatures have no moral right to set up officials with power to interfere with the liberty of private judgment in Health questions any more than in Religious affairs. Obviously the state of the persons who may come into contact with so-called infectious germs is the determining factor in the question whether they will be infected or not; and as germs may be benign or malignant according to the state of the persons whom they attack, our legislatures and health authorities would contribute to the public interest much more by advising the public how to live so that germs shall not infect them, than in interfering with the public liberty in the ways which they so much affect. I read in a standard work *re* germs this sentence: "*These parenteric* germs may be closely related to the enteric germs, or may be widely separated therefrom." I ask how can Parliament be so reckless of liberty as to justify forcible interference with family life on such evidence? It is most short-sighted and most unjust to suggest such a course.

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*It is rather an interesting fact that just after these questions and answers have been written I should have read this sentence in a medical journal. "He" (the doctor) "knows, too, if he has experience, that bacteriological examinations may be no less fallacious than any other method of examination" (16th November, 1927).

Further, I think we might be less in love with compulsory methods in matters of opinion than we are if I am right in interpreting the English Registrar General as saying that in seventy or eighty years cancer has multiplied by five as a cause of death, that suicide has more than doubled in that time, and under the use of such methods; that influenza, which used to visit this country only every thirty or forty years, has never been away since 1891; and that mental deficiency is so abundant among us that our educational authorities are at their wit's ends to know how to cope with it. If such are the effects of the use of compulsory methods in questions of medical opinion, don't you think that things might be better if perhaps we tried more persuasive methods?

THE KINDS OF FOODS

I. *72.* When you were talking about food and how much is necessary for the restoration of the waste in a grown man weighing 10st. or 140 lbs., you said as I understood you, that although taking 14+7 or 21 ozs. of food daily would be enough for that purpose, it would not be wise to take 21 ozs. of lettuces or cabbage or cucumber as a good method of food supply. Would you say (even although Hippocrates said 2,400 years ago that the amount cannot be determined "to a nicety") would you say that 1½ lb. of apples or pears or of potatoes: or say 1lb. of apples and ½lb. of whole meal bread would be enough for the average man?

M.A. 72. Yes I think so: and I should much prefer the latter combination, although I think that 8 oz. of bread a day is rather too much for the average man.

I. 73. Why?

M.A. 73. Well: On 8oz. of bread a day I think that the average man will be apt to have colds because his respiratory tract (developed as we shall see later from the digestive tract) will not be able to carry off so much CO_2 and other gaseous matters as must be formed from the digestion of ½lb. bread daily; and so the physiological chimney will be apt to smoke, and the man will have a cold. But I think that the mixture contains a better arranged supply of the material required for the restoration of the body. Foods are of four kinds, or we may perhaps say five:

First there are those containing nitrogen or what are sometimes called proteids. These are meat of all kinds, cereals of all kinds, wheat, barley, oats, rice, eggs, fish, milk and cheese.

Second: Foods not containing nitrogen, often called carbo-hydrates, represented by such things as sago, tapioca and the starches and sugars generally.

Third: Fats and oils, like fat of meat, the cream of milk, olive and salad oil and butter. These are often called hydro-carbons.

Fourth: The Mineral elements like potash, sodium, calcium, iron, iodine, etc. Of late years physiologists seem to attach more importance to the proper balance of the mineral elements than almost to any other: and they warn us against boiling our vegetables, suggesting that boiling vegetables dissolves the mineral salts out of them, and so is apt to deprive us of much of the value of our vegetable food. As to that, there may of course be differences of opinion. Even if it is admitted that preservation of the mineral balance of our food is a very desirable thing, still on the other hand it seems to be true that the changes in the mineral constituents of food must always be much less than the changes in the proteids, the carbo-hydrates or the fats. From this point of view the mineral interchange does not seem to have so much importance as that of the other sorts of foods. I admit that this reasoning does not settle the question because some constituents as hormones seem to act beneficially to the body by their presence in it only, and not through the change of substance which takes place in them. Still the quantity of the mineral constituents of our food must be less than of the others named. Lastly there is the fifth sort of food namely water.

I. 74.—Do you think that water plays an important part in the nutrition of the body.

M.A. 74.—I do indeed. Water plays a much greater part than is generally appreciated. Without water there is no animal life such as we know it. All animal bodies contain much water, so much so that if an animal body weighing 140 lbs. is dried it would not weigh more than 50 lbs. or less. Of course it could not be living, speaking conventionally, in that case, even if as I think it is better to divide bodies not into living and dead but into more living and less living.

I. 75.—**Did not the ancients divide nature into four elements, one of which was water ?**

M.A. 75.—Yes they did : and we moderns often laugh at them for the crudity of their division of elements into earth, water, air and fire : but the question is are we wise in doing so ?

I. 76. What would you say ?

M.A. 76.—Well I should reply that without solids or semi-solids like earth, such as muscle or bone or jelly or jellified viscera no animal life is known : that without water as we have seen there is none : that without air animals cannot and do not live : and that as to fire we all know that without fire under its modern name of heat or temperature, there is no life either. Now although it is quite true that neither earth nor water nor air nor fire are elements, since we have discovered that the first three are compounds or mixtures of elements and that the last is evolved when chemical combinations occur, still we must admit that in the then state of knowledge some of our predecessors gave a very good account of things, and one that even if we have a little fuller knowledge than they had, it is not wise to despise.

I. 77.—You put a different complexion on things from what occurred to me. I must confess to feeling surprised at what you say about water ; but I suppose that you would not deny that there might be life without the introduction or without any use being made of these so-called elements at all ?

M.A. 77.—Well who is speculating now ? Of course I hope that I am not so immodest as to imagine that there is nothing in the world or in the universe beyond what I know, especially as I am quite unable to explain my own existence. There is another fact about water which I wish to mention ; for I find that we actually manufacture water in the body, because a person may part with a pint or two a day for years and years of water more than he drinks, and still be in good health: so that I am driven to conclude that a sort of vital chemistry is unawaredly going on in our bodies.

Apropos of this I have often thought that the different ways in which the compound known as water is formed out of the chemical combination of the two gasses, Oxygen and Hydrogen, is full of instruction. If these two gasses are mixed in a jar in a laboratory, and an electrical current is passed into the mixture, a drop or two of water is formed with the occurrence of an electric spark and a sharp detonation. But in the living body the same combination seems to be made under the action of the life-force without the occurrence of any spark or noise. The former method of forming water seems not unlike a sudden and creative process; while the latter may be compared with an evolutionary one. In both conditions, however, something that did not exist before comes into being.

I. 78.—One gets surprised more and more.

M.A. 78.—Yes things are more wonderful than we thought, our familiarity with them being the chief reason apparently why we do not wonder more than we do.

To return now to the question of Food and the four or five kinds of it, it may be said that it is accepted doctrine among physiologists that it is desirable to maintain a proper balance between the various kinds of food if we wish, as most of us do, to be well. Further I think it may be said that there is a growing belief or feeling, at least if we may not call it a belief, that there is danger in taking too much food. Perhaps there is more agreement among physiologists as to the danger of taking too much of the proteid elements of food than some others, although even as to this, agreement is not so general as could be wished. In the United States of America some authorities recommend actually twice as much proteid food, that is eggs, meat, fowl, bread, etc. than do some others, and this is very confusing to students.

I. 79.—How do you think that such a question is to be settled ?

M.A. 79.—It must be settled, if not "to a nicety," then at least approximately, for our life depends on it. But I think each of us must settle it or try to settle it by our own experience.

I. 80.—On which side does your experience lean ?

M.A. 80.—You will have gathered from what I said that I strongly incline to the opinion that far more of our ill-health is due to the ingestion of too much food than to our taking too little.

IS CARNIVORISM A PERMANENT OR ONLY A TEMPORARY ARRANGEMENT OF NATURE ?

I. 81.—Yes, I have gathered as much. I sometimes wonder, Doctor, when thinking of the eating of flesh, if the order of nature is that animals should prey upon one another ? Cats eat rats no doubt ; stoats and weasels eat fowls ; tigers eat fawns and deer and men. But is that the order of nature ? Or is the continuance of those conditions compatible with the order in which the evolution of nature is moving ?

M.A. 81.—Tigers and lions, like fawns, find themselves living as do men without their own consent. It would indeed show reckless indifference on the part of nature if no provision were made for the feeding of such animals. But is it not true that predatory animals destroy not only their prey, but also themselves ?

Are they not much more sickly than the herbivorous animals? Are not their lives shorter? Are they not much less gregarious and therefore so far less amenable to the influences of family life? Are they not also much more restless, much less enduring and patient than the herbivorous animals, and much less efficient for the useful purposes of life? As evolution advances the environment becomes unfit for them, and they tend to die out. It seems to me as if nature herself was engaged in the act of abolishing these carnivorous and predatory animals, and as if she were in the act of establishing a higher form of civilisation. At any rate, we may at least say that while nitrogen is necessary for human nutrition, and therefore that proteid food must be provided, it is a fact that nitrogenous substances can be got from the vegetable kingdom in the form of cereals, and if thought fit, in addition from the animal kingdom in the form of milk and eggs. And as I have said, most physicians are agreed that it is easy as it is also dangerous to take too much proteid food.

As to the second division of food, the starches and sugars or carbohydrates as they are often called, their main functions seem to be to act as a source of padding to the body, so that it may not become too thin and scraggy, and to help to form glycogen which, by being stored in the muscles and in the liver, may by its slow oxydation serve to maintain the heat of the body at about 98.4 degrees F. as, if much above or below that line, it is not so fit a machine for the force of man-life to function through, and so the machine would become unfit for its purpose, were not some arrangements of this kind made. The interesting question arises: How does the force of man-life make this provision? We can hardly imagine that it knows either what it is doing in acting so or why it is doing it. Is it because man-life is under the guidance and direction of powers that do know, and that are therefore conservative of life and, so far from being indifferent to life, seem on the contrary to be regardful of it ? Or is it that man-life or anthropine-zoo-dynamic, being a variety of pan-mono-dynamic, naturally acts in accordance with the design of the Source of pan-mono-dynamic ? If so, that is hardly compatible with the view that nature is little else than a struggle for existence in which the stronger animals and organisms relentlessly destroy the weaker and inferior.

Of the third division of food, oils, fats, butter, etc., only very small quantities can be taken or are required, and probably they help with the formation of glycogen among other things. It is interesting to notice that, as all kinetic energy is warm and luminous, so man-life is warm intrinsically, and therefore it is the life-force which is the original cause of the body-heat, but that it makes arrangements unawarely to itself whereby the temperature can be maintained at such a point as that the machine through which man-life works shall be kept at a temperature compatible with its highest efficiency. How this comes about is, I must say, a constant source of surprise to me.

Then there are the fourth and fifth divisions of food—namely, the mineral elements and water, which have already been dealt with.

I. 82.—Then you do not think that on the whole the order of nature is that animals should live upon one another ? And you seem to think that the carnivorous animals are less healthy and also less efficient for the useful purposes of life, and also less long-lived than the herbivorous ?

M.A. 82.—That is on the whole my view.

I. 83.—Why do you think so ?

M.A. 83.—Well, it seems to me that the order of nature is, on the whole, that the plant assimilates the mineral constituents into its nature and that the animal lives on the plant.

I. 84.—What evidence can you offer for this view ?

M.A. 84.—Nature seems to me to be a co-operative and going concern for the procreation, improvement, development and even perfecting of life, not a concern of death at all, as some of the ancients thought when they said she was a μελέτη θανάτου. She seems to me on the contrary to be a concern of life (a μελέτη βίου) in which the parts work co-operatively to that end, even if they do not seem to be aware of what they are doing. Look how, through the co-operation of the alga or sea-weed and fungus or mushroom tribe, the lichen seems to be formed, and see how the lichen with its better form of chlorophyll seems to be found in the most unexpected places in nature, on high and cold rocks and inaccessible places—arctic, temperate and tropical—just as if it was intended for animal sustenance.

I. 85.—You seem constantly to surprise and confuse me. Having been brought up as an evolutionist, I find it difficult to reconcile my view that nature is a struggle with your suggestion that she is nothing of the kind, but a co-operation towards life and health and peace. Is not that your view ? But tell me are you a believer in Evolution ?

M.A. 85.—Yes, I am an evolutionist certainly. I do not see how any observing and reasoning man can be anything else. It seems to me, as I said before, when you seemed rather distressed at my persistence in seeing ethical and moral considerations in my inquiries into nature, that this view is quite compatible with the view that nature gives us, little by little, more and more information as to the ways in which she works, according as we humbly and patiently inquire into her doings. She seems to give us line upon line, precept upon precept, here a little and there a little, according as our capacity increases and according as we are able to bear it. You see, or I should like you to see, that this view is not in disagreement with the view that there is a great purpose and Purposer behind nature and immanent in nature and of which nature is the expression and manifestation.

I. 86.—There you are again, introducing considerations which by tacit consent we agreed were to be barred.

M.A. 86.—Excuse me. I never agreed to bar them. I could not do so, because I think them the most important factors in our examination into nature, and I must remind you that in accepting the view as you seem to have done that nature is red in tooth and claw, ruthless and reckless of life, and indifferent to suffering, you have yourself introduced, or at least agreed to the introduction of, the very considerations to which you object when I refer to them.

I. 87.—Well I am only accepting the general view. I know only what I am told, subject of course to the little correction which I am able to give it by applying my observation and reflection to what the scientific authorities tell me.

M.A. 87.—Yes; that is pretty well put. None of us seems to me to be capable of comprehending nature. She is too great for us; and we ought to be careful before we make up our minds as to whether there is a purpose or a Purposer behind her.

IS EVOLUTION COMPATIBLE WITH THE IDEA OF CREATION?

I. 88.—I admit that; but do you think the acceptance of evolution to be quite compatible with the idea of creation? Do you think that it is compatible with the statement in the book of Genesis that in the beginning God created the heavens and the earth?

M.A. 88.—Yes, I do; because the statement does not tell us when the beginning was; and because as to creation itself, plainly some wonderful things and also some more wonderful organisations have come into being which were not before; and because my mind is so constituted that I must look for a first cause of these things; and therefore I believe that in the beginning God created the heavens and the earth; and that although on further examination creation has probably not been so sudden as I once supposed, still the Originator, whether slowly by evolution or suddenly by creation, has equally been the cause, and has actually made and continues to make and will continue to make all things out of nothing except His own good will to do them. But I will partly answer that part of your question by asking you another. Do not scientific men say constantly and with one voice that of origins we know nothing?

I. 89.—Yes, I have heard that often. Do you think it is true?

M.A. 89.—Yes I do; there are only two answers to the question of origin, the first with Moses: "In the beginning God": the second with Professor Huxley, who replied: "I do not know." And there is a modification of the second answer by a personage called Gallio, who may be understood to have said that he neither knew nor cared.

I. 90.—Do you care?

M.A. 90.—Yes, I care immensely. It is for you to say whether you care or not. No one ought to try to force you to care; but for myself, I confess the question seems to me to be of the last importance, so that I *must* care. I dare say you remember how Huxley arrived at the conclusion that there was a conflict between man and the nature of which he formed a part. Man objected to the ruthless recklessness and indifference to suffering which seemed to be manifested in nature, for he felt that that recklessness was opposed to the pity and compassion which he felt to move him in the depths of his soul. Here was an impasse indeed, but it had to be answered, if nature was and is, as it must be assumed, the expression of the mind and will of the Maker of Nature. If you come to think of it, the view which I am putting before you shows that there is no need for this conflict, since the truth is that nature is a going concern for the procreation, improvement, development and even perfecting of life, and that death is only an incident in that progress. It seems to me that the arrival of that impasse ought to have made inquirers into nature ask whether perhaps there was not some flaw in the mode of their previous investigation, and whether it would not have been better if they had determined to reconsider the whole question from the beginning. Had this been done, I think that some solution of the difficulty, like what I am now suggesting to you, would soon have become apparent.

CAN WE PUT AN END TO SUFFERING AND DEATH ?

I. 91.—Do I, then, understand you to suggest that there is any possibility, however remote, of putting an end to suffering and death ?

M.A. 91.—Yes, that is just what I do mean.

I. 92.—Well, I have been surprised a good many times already, but I must frankly say that it has never before occurred to me that any sane person could expect to see suffering and death abolished ! ! ! Whatever do you mean by talking in such a way ?

M.A. 92.—It seems to me that the Life Force is always striving to express itself in a medium suitable for its expression. Pan-mono-dynamic or the universal energy contains, as it comes from an infinite source—an infinite variety of forces ; and as it comes from a living Source, that infinite variety of forces are each of them in its own way alive. The last mark of life is motion, and that all things move is an observation made in very early times indeed in the history of human thinking. Well, each variety of the universal energy, each variety being alive, procreates a body suitable for its expression or manifestation, a somewhat low variety of it procreating a somewhat low form of body suitable for itself, and if the Life Force is not of a very high order, naturally the body in which it expresses or manifests itself will in course of time vanish or pass away, and that form of life will appear to die.

I. 93.—*Appear* to die, Doctor ? What do you mean ? Do not all bodies die ?

M.A. 93.—Up to the present, they all do, or have done, but if the Life Force were more high and subtle, is it quite certain that it would, or at least, might not procreate for itself a body that, like itself, would not or could not die ? You see, I am obliged to ask questions from time to time in order to make my meaning clear. We speak of our friends dying and of dying ourselves, but obviously that is only a figure of speech, for we all believe that the life does not die, and that as it had no beginning it has no end.

> " Never the spirit was born, the spirit shall pass
> away never.

Never was time it was not ; end and beginning
are dreams ;
Birthless and deathless and changeless the spirit
remaineth for ever ;
Death hath not touched it all, dead though the
house of it seems."

It is thousands of years since that was said, yet before that time the death of the body had occurred, and though thousands of years have elapsed, bodies go on dying and have gone on dying since that time, and there is no cessation of death.

I. 94.—No : nor will there ever be cessation.

M.A. 94.—Why are you so sure of that ?

I. 95.—Well, if our only canon or postulate of inquiry into nature is to assume that the present and the future resemble and will continue to resemble the past, surely you do not mean to suggest to me that I am to give up that canon of inquiry and assume, because you ask me to, that the future will not, or may not, resemble the past and that death itself may die ? We must have some fixed canon of inquiry surely ; or how are we to be delivered from futility ?

M.A. 95.—Sometime after, and probably a long time after, the Indian song to which I have just referred was sung, life was compared with a boatman and the body with the boat. Since I knew of it I have always thought the simile an excellent one. And if we add to it the idea that the boatman is not only conveyed by his boat across the sea of life and across the river of death or from earthly to heavenly life, but that he also builds awarely or unawarely such a boat as is suitable for his conveyance, then we may perhaps see that as the life becomes higher and finer the boat becomes subtler and finer also, and so before a very long time has elapsed, the higher and more celestial life may make for herself a boat or body which, like the life that forms it for her conveyance, may never die. That does not seem to me to be impossible; and if evolution is not going to stop where it is (and how dare we set bounds to the action of omnipotent, omniscient and all considerate power?) then the suggestion seems forced on us that as environment is prepared for the higher form of life to occupy it, and new environments for still higher forms, the new higher forms do occupy it. And if this process goes on for an indefinite period of time, it can easily be seen how the body may become, like the soul or spirit, immortal.

ASCENT OR DESCENT?

I. 96.—You spoke of descent of life. What do you mean? Is not life an ascent—not a descent? Does not life begin in lowly protozoal forms, and is not the testimony of the rocks clear that these lowly forms have been succeeded by the appearance of higher forms—star fishes, molluscs, vertebrates, mammals—till we find man himself, up to the present, the highest form of life we know? I am surprised to hear you talk of descent when nature plainly demonstrates an ascent of life from low to high and higher and highest forms.

M.A. 96.—That nature *appears* to act in this way I admit. But does she really do so? I doubt it. You remember how we all once believed, for our senses seemed plainly to tell us that it was so, that the sun moved round the earth; and how we actually murdered and burned to death some who said that it was not so. Even now, although we all know that the earth moves round the sun, we still continue to speak of the sun rising and the sun setting, whereas in reality we know that the part of the earth on which we are rises into the sunlight in the morning, while at what we call sunset, the part of the earth where we are located turns her back to the sun, and so we go into the darkness of night. I suggest to you that the lower forms of life have already descended into environments fit for them and that when they arrive there they, by doing their lowly work in their own sphere, unawarely prepare a place or environment and make it fit for occupation by a form of life higher than that of the present occupant. Would not that account equally for the apparent ascent of higher from lower forms? And would it not do another thing—namely, clear our perceptions? In speaking of ascent from lower to higher forms I do not know if you meant that these higher forms are the descendants of the lower forms? Many do speak as if they think so, for they speak and write of all the forms of life as having descended from a common ancestor. I have always felt that the evidence offered to justify this view is very weak. To me there is no evidence that these forms are descended or ascended (note how convertibly we use these words, and how confusing it is) from one another. To me they seem to be made alike because they proceed from a common source, not from a common ancestor, for which view I see, as I have said, no evidence at all. Well, it seems to me that as the alga and the fungus co-operate to form the lichen which introduces a higher form of chlorophyll which the animal may be able to assimilate, and as the bee in pursuit of its desired nectar (not even knowing, I suppose, what it wants) visits flowers and gets its wings and legs covered with pollen in the act, and then conveys quite unawarely this pollen to a distant flower of the same sort, and as in turn this distant flower has a better fruit through the carrying out of these processes, so is the order of nature introduced, and unawarely to the agents, carried on. The bee does not know that nature abhors self-fertilization, but acting as if she knew, she becomes the means of producing a better fruit, which in turn forms a better sustenance for some animal. The bee, you see, quite unawarely prepares the way for a higher form of life, which in due time descends to occupy the place and conditions prepared for it, because the bee did her work in the place in which she was. So it seems to me there are various kinds of what seem to be ascending animal forms, and no doubt are so in the sense that they are higher in the scale of life. What appears to happen is that these higher forms of life, seeking to express themselves in suitable bodily forms, and finding the environments made suitable for this by the unaware action of more lowly predecessors, descend to embody themselves accordingly. It is an apparent ascent, but it is really a descent, because the next form of life each higher than the one which preceded it, proceeds each in turn to occupy the place prepared for it by the unaware performance of their work by the forms that lived before. When the process rises to a higher level the lower forms of life may no longer be unaware, like the bee, of the part they are playing in the work or scheme. Man may to some extent rise to an understanding of the position he holds in the scheme of natural evolution, and may even desire to assist in carrying out the scheme. The Baptist did know that he was a forerunner of a greater than he, and so, I think, may we if we wish to, for undoubtedly we have understanding, and so we may know.

I. 97.—I must admit to feeling much surprised at the points you put before me. You can hardly expect me to accept all at once the views you propound, inasmuch as they conflict so with authority, especially as I know or believe that many of these authorities were and are of great weight, and have, besides, given very much time and attention to the studies they were engaged in. Now, however, that I come to think of it, I remember that I have seen the expression " descent from a common (protozoal) ancestor" as well as ascent from a common ancestor, just as if the expressions were synonymous.

M.A. 97.—Yes, I could give you many quotations to that effect.

ORDER NOT CHAOS

I. 98.—You put before me a set of speculations that I feel I can admit to be interesting and even attractive; but they are so wholly divorced from the realities of life that I am astonished that anyone professing to be a teacher should venture to propound such absurdities. I must at least ask you to offer some evidence for the likelihood that any such conditions as you hint at will occur.

M.A. 98.—What is your idea as to the order of nature? I suppose that you will admit that on the whole it is a cosmos rather than a chaos?

I. 99.—Yes, on the whole I admit that. I used to think that it was and is a chaos; but on the whole I have changed my mind and admit that it is a cosmos.

M.A. 99.—Then you may be ready, when you think of it, to admit that when it was said: " In the beginning were chaos and love," perhaps it was in the minds of the observers that the chaos existed, for certainly the day succeeds the night and the night the day, and such succession implies order. Now, what I want to ask is, do you think that orderly succession is likely to have occurred and to keep recurring without an Orderer or some Will immanent in it while transcending it ?

I. 100.—Well, I must admit that what you say does not seem quite unreasonable, but you cannot expect me to give unqualified agreement to it all at once. You seem, then, to think that there is no evidence for the descent or ascent of animals from a common ancestor, although you admit that the testimony of the rocks is clear, that as time has gone on, animal forms appear to have shown higher and higher manifestations ? You seem to think this shows procreation by a common force or energy much rather than descent or ascent from a common ancestor ?

M.A. 100.—Yes, that is my view : and I say, if you accept it you will be relieved of the difficulty of accounting for the similarity in the make or construction of animal forms, for their having skins, limbs, sense-organs and viscera, like one another, although there is no descent from pig to elephant, or from cat to tiger, nor from man to ape or ape to man.

I. 101.—Well—yes—your view does seem to simplify things a good deal, I must say ; and I must admit that I have always had a difficulty in seeing how a tiger, a pig, a cow, a dog, a horse, an ape, an elephant and a man could ever, with however long a lapse of time, have descended or ascended from a common ancestor. That they might have been procreated as you term it by different phases of pan-mono-dynamic does seem to offer a much easier explanation. In fact, I see no difficulty in accepting it at all, unwilling as I still am to have the idea of creation or of a Creator interpolated into science, as I have already told you.

M.A. 101.—I am glad that you do not think this view so unreasonable as at first you supposed. But, come now tell me : Do you think it likely that day should succeed night and night day, that the seasons should succeed one another with unfailing regularity, that the heavenly bodies, the sun and the moon and earth and the planets of our solar system, and even the fixed stars seem to come to their appointed places at their appointed time—*seem* I say to do so, for the motion probably is in us and not in them—do you think that all this majestic order should occur without an Orderer ? Or do you not think that it is at least possible or even likely that order is produced by an Orderer and Law by some Will ? So that perhaps an ancient seer who said that the Heavens declare the glory of God and that the firmament showeth forth His handiwork may not have been so far wrong ?

I. 102.—Well, yes, I think it is quite reasonable—or at least not unreasonable.

M.A. 102.—Well, we saw that the universe is moving, and that as the last fact from which we infer life is motion, the universe is probably alive in all its parts, some parts more and some less but all alive more or less.

PERMANENT INTERCHANGE OF POWERS

I. 103.—Well, yes, but what of that ?

M.A. 103.—Well, did we not see with interest that the heavier bodies attract the lighter or less heavy—not to rush into one another and to be broken up into atoms by an irresistible force, but to rotate round them in an orderly way ? And did we not also see that the warmer bodies part with some of their heat to those that are less warm ? And that those that are more illuminated part with some of their light to those that are darker ? And that by means of this automatic interchange did we not see that the motion of the universe was and is being conducted? And that this automatic and apparently unconscious action might be intended as an inspiration to us who have been gifted with more insight than the heavenly bodies or than the lower animals, that we should try to do likewise, and to part voluntarily with any surplus wealth or powers that we might possess to those of our friends or neighbours who have less?

I. 104.—Well, you do seem to have established, or at least made more likely than I should have thought possible, the positions, First, that nature, wielding practically omnipotent powers uses them for the promotion and improvement of life and not for destruction, for orderly rotation and not for chaos; second, that she acts as if she were considerate and merciful and not vindictive; third, that she is a concern of life and not of death; and fourth, that these facts seem to suggest very strongly the existence of an Orderer and Creator immanent in nature. If I am not yet fully convinced, I am at least prepared to give these propositions much more favourable consideration than I formerly was. Still, I can't help feeling that it would have been better if you had kept these considerations out of our inquiries into health, and I say this particularly in view of the great differences of opinion that different men hold on these points.

M.A. 104.—Well, I could not, in attempting to expound what I think about health, refrain from putting the subject before you in the way in which it occurs to me; nor could I refrain from saying that as our aim is to make life long, efficient and healthy, and perhaps incidentally happy, we cannot in my opinion and experience attain to the possession of these benefits by direct search or unless we put some restraint upon our appetites and desires; and I have regretfully to add that I see no present prospect that humanity is prepared to do any such thing.

SELF-RESTRAINT AND ABSTINENCE

I. 105.—Why do you say that ? Why do you regretfully see no prospect of attaining your end unless we put some restraint on our appetites and desires ? I should have expected that humanity might be willing to do that, if you could show that they will probably have more than a return for their self-restraint in better health.

M.A. 105.—My experience is that your expectation would be disappointed. I find that people will restrain themselves or abstain from any one thing and sometimes even for a considerable length of time, provided they are allowed greater freedom in other directions ; but what they will not do is to exercise strict moderation in all things. What they generally do is to change their medical adviser. Of course, I make no complaint of that. They are, and ought to remain, perfectly free in that respect as to whether they will ask for medical advice or not or as to whom they will consult. But what they do is to frustrate the medical adviser when they do not like his advice ; and of course different advisers take different views, and it does not lie in the mouth of any one to say that they do not do so quite honestly. In any case, patients will not follow advice which they do not like.

I. 106.—But why do you lay such stress on self restraint ? Perhaps you are in the habit of overdoing it ?

M.A. 106—Well, of course it is a matter of opinion ; but then the whole of medical practice is the same, or nearly all. I have admitted that there is no certainty. Nevertheless, my reasons for advising the course I follow are numerous. *Take colds for* example. Nature, as was mentioned in a previous place, develops the lungs from the digestive tract; and there appear to me reasons both theoretical and practical for my belief that she intends us to understand from that fact that respiration is subsidiary to digestion, and that when too much CO_2 and other gaseous waste products are formed in the digestive tract than the lungs can properly deal with, we get cold because in fact the physiological chimney smokes. It appears to me that in plain language nature seems to say to us that we eat and drink our colds, our bronchitis, our asthma, our pneumonia, our consumption of the lungs.

I. 107.—You said you had numerous reasons for giving the advice you do. What other reasons do you offer?

M.A. 107.—Well, the whole course of nature seems to me to point the same way. The mouth, for example, is, as everyone knows, the ingress to the digestive tract; but it seems to me to be a very significant fact that the mouth is not developed from the digestive tract, but is formed like the eye and the ear and nostrils as a depression in the face, the face itself being developed with the head. Now, the head is the cavity formed for the reception of the brain, which is, of course, the organ of the perceptions and of the will, and probably also of the emotions. Now, if any one is not impressed by these facts to understand that she means us to put control on what goes into our mouth, that at any rate seems to me to be her silent suggestion; and that being so, I am bound to advise clients in accordance with my judgment and my reading of nature whether they like it or not.

I. 108.—Have you any other reasons? For, of course, we must understand that you are more or less alone in this view of yours. In fact you may have discovered that some of your critics say that you are rather "viewy," and carry things further than they think reasonable.

M.A. 108.—Well, I dare say it is so, but I am greatly impressed by the further consideration that we do not, like the lower animals, put our mouth to the dish when we eat, for we feed our mouths with our hands, which, like Hermes, the messenger of the gods, appear to be the messengers of the will ; and this fact greatly confirms me in the view I am compelled to take, especially as I find that it works out well in practice in cases where I can induce patients to follow the advice. As I have told you, I have found asthma, though it is often spoken of as an incurable affection, to be anything but incurable, and in fact I find it to be a very tractable disease indeed.

I. 109.—Have you any other reasons ?

M.A. 109.—Yes. I am confirmed in my opinion because I find it in keeping with nature's suggestions in other directions ; for, as I have said, I find the warmer parting with heat to the colder ; the more lighted parting with some of its light to the darker ; and the heavier bodies persuading the less heavy bodies to rotate round them in an orderly way, as they seem to part with their freedom, so to say, to do as they like ; but seem to find it better to allow themselves to be placed under control. In fact the treatment of colds so falls in with the great schemes of nature that I am more and more convinced the longer I study her and her methods that it is in accordance with the scheme of things that I should advise patients to take this view. And I find that those who do take it find it very much to their benefit to do so.

I. 110.—Well, I don't say that you have not put forward some reasons for your advice, but I can imagine that both doctors and druggists may complain that their occupation is in danger, for I seem to hear them saying, as an Irishwoman did in the workhouse once in my hearing: "Never a pill and never a powder and never a plaster, but only diet all the time, and indeed very little of that sure." And then she proceeded to wonder if the medical adviser was a "doctor at all, etc."

M.A. 110.—Yes; I should laugh also, but I hardly can when I think of some of the struggles for breath that I have seen, and seen helplessly before I saw, as it seems to me, more into the meaning of things than I used to do, and so became a little less unable to help sufferers. I admit, however, to having several times been made to feel that much of our experience would be a screaming farce if it were not so often a tearing tragedy.

I. 111.—Would you accept the statements that I have seen somewhere and more than once, that Life is the sum of its phenomena, and that Life is organisation in action?

M.A. 111.—These statements seem to be true so far as they go, but they give no information. You might as well say Life is Life, which of course is true but uninstructive, and therefore, a futile thing to say. It seems to me, however, that to describe life as the sum of the phenomena of which it is made up and not also as the immediate cause of these phenomena is to give it the name to live indeed but to deprive it of its power. And as to the second statement, we ought surely to make up our minds whether we think that life makes organisation suitable for its expression or whether we think that organisation makes life. For me there is no uncertainty at all. It seems to me quite certain that life is the cause of its phenomena as well as the sum of them, and that organisation is made by life and not life by organisation, because I am certain that forces cause things and not things forces, even if I admit that in human experiences the two, forces and things, are always experienced together. The settlement of this question depends upon the same consideration which led me to say that I think it is far nearer the truth to say that matter is a property of gravitation than to say with the majority that gravitation is a property of matter. But I should like to get on with our inquiry.

THE PARADOXES OF MEDICINE

I. 112.—With all my heart. I have heard you say something about the paradoxes of medicine. May I ask what you mean by these ?

M.A. 112.—Yes ; the two paradoxes that meet us early in the study of medicine seem to me to be these. First the same causes produce opposite states of the organism or body.

Second : opposite causes appear often to produce the same state.

I. 113.—What do you mean by that ?

M.A. 113.—I mean that the effects of taking too much food seem not infrequently the same as those usually and justly attributed to taking too little, namely, pallor, listlessness, want of energy, and attenuation.

I. 114.—Well, but how ? Do you mean that people are made thin by taking too much food ?

M.A. 114.—Yes, that is just what I do mean. No doubt people are also made too stout often by taking too much food ; and that people can generally understand ; but they are very often made too thin by the same overplus, and it is very difficult indeed to get people to understand that.

I. 115.—Yes, it does seem difficult. How do you explain it ?

M.A. 115.—It is explained by this : that the body often becomes blocked by too much food, and this process, preventing functional changes from occurring (blocking of the connective tissues, e.g., preventing the flow of lymph), the body thus becomes thinned by too much instead of being expanded as we might have expected it to be.

I. 116.—That is very interesting. Have you anything more to say about it ?

M.A. 116.—Yes. The condition is paralleled by many conditions in business ; for business ceases or becomes much less brisk in two conditions. First, when stocks are so low that little business can be done ; second, also when stocks are so abundant that the trader is afraid to buy or sell in case a turn in the market may lead to his making a loss when he hoped for a profit.

I. 117.—What do you mean by the paradox that the same causes produce opposite states ? That seems more difficult to understand than the first.

M.A. 117.—To understand this I often explain that many bodily structures are made of two sets of elements, one set which go across the structure, and another set which go along the length. The former we may call the transverse, or cross elements, and the latter we may call the longitudinal or long elements. The construction is not unlike the weft and warp of cloth. Now, it is obvious that when the former are stimulated or made to contract, the structure will be narrowed and lengthened, and if it is a tube like a bloodvessel or the intestine, the blood vessel will be emptied of its contents and the part will become pale ; while if the longitudinal are contracted by stimulation, the vessel will be shortened and widened and at the same time will be filled with blood, and the part will therefore be reddened. Hence the same cause, namely, stimulation will, if applied to transverse elements, cause pallor and slowing of action; while if it is applied to the longitudinal it will cause redness or blushing with increase of action. If you apply the same considerations to the large intestine, which is an eliminative organ, you will see that contraction of the transverse elements causes narrowing and lengthening of the tube, with tendency to constipation perhaps after a preliminary emptying of the bowel; while if it is applied to the longitudinal it will shorten and widen the tube and will tend to hurry the contents through, and so to produce diarrhœa.

Stimulus to the intestine, therefore, may and often does cause both constipation and diarrhœa, just as when applied to blood vessels it may cause and often does cause both pallor and blushing. It really comes to be rather puzzling, especially when, as so often is the case, the question of treatment has to be considered.

Another consideration has to be borne in mind, namely, that life consists in the alternate contraction and also alternate relaxation first of the longitudinal and then of the transverse elements of the structure. We must also remember that contraction of the transverse elements coincides with relaxation of the longitudinal, and that contraction of the longitudinal coincides, or is simultaneous, with relaxation of the transverse. What happens is this:

1. There is contraction, say, of the longitudinal elements of structure;
2. Then a pause;
3. Then occurs contraction of the transverse;
4. Then another pause

and then re-contraction of the longitudinal; and the alternating process is repeated.

There are other facts to be kept in mind if you want to understand this alternating process, one of which is that the actions of the longitudinal and of the transverse tend to be proportional to one another. Moderate action of the longitudinal tends to be followed by moderate action of the transverse; while immoderate or too strong action of the one tends to be followed by immoderate action of the other. In this way the healthy balance of the actions of the organism is apt to be lost. The importance of this is enhanced when we reflect that excess of transverse contraction is apt to result in cancer, while excessive longitudinal action is apt to result in tuberculosis. Now the supreme importance of these facts and successions as regards treatment lies in these following propositions:

(*a*). We cannot cure, although we may for the time palliate, constipation by aperients or purgatives. Nor can we cure long continued diarrhœa by astringents, for this reason: Long continued or chronic diarrhœa is accompanied by over-stimulation, particularly of the longitudinal elements of the bowels, and by relaxation of the transverse. Astringents like alum and bismuth act by stimulating the inaction of the transverse elements; but even if we can succeed in doing this to some extent, although it is difficult to do it, still over-stimulation of the transverse elements is followed in due course by over-stimulation or over-contraction of the longitudinal elements, and so the diarrhœa continues. For these reasons I say that we can neither cure chronic constipation by purgatives, nor can we cure chronic diarrhœa by astringents. But a corollary to these statements of a very practical character is (*b*) that both chronic constipation and chronic diarrhœa can be cured by diet and in a way which may perhaps sound surprising when I proceed now to make my third statement on this subject; namely:

(*c*). That as both chronic constipation and chronic diarrhœa are due to over-stimulation, the one of the transverse elements of the bowels and the other of the longitudinal, they must both be treated alike, namely, by the attempt to remove the cause of the over-stimulation.

I. 118.—Well; this does surprise me. Do you really mean to say that chronic constipation and chronic diarrhœa must both be treated alike?

M.A. 118.—Yes, I do; and the best way to effect the apparent contradiction usually consists in diminishing the number of meals taken and in altering the quality of the diet. And of course it follows and must follow that the object to be aimed at, both in the treatment of chronic constipation and of chronic diarrhœa, is to relieve the overaction in each case, and as the cause is nearly always too much food taken too often, the proper treatment to adopt is to reduce the number of meals in both conditions. It not infrequently happens that a man and his wife living together for thirty or more years may suffer, according to their constitution, in opposite ways—he from chronic constipation, she from chronic diarrhœa. They have both had, let us suppose, four daily meals. They would both probably be cured by reducing the meals to two a day and by, to some extent, altering the character of the diet. Thus, if the constipated party took frumenty at one of his meals and vitamines, like uncooked lettuces, cucumber, tomatoes, etc., at the other, with a due proportion of wholemeal bread; and if the sufferer from chronic diarrhœa took, say, eggs and milk puddings, with a due proportion of brown bread, they would both probably be cured. I say "probably," because the condition would have to be observed that neither state had gone too far; for if the man's state had gone to cancer or the woman's to tuberculosis, we could not expect cure in either case.

I. 119.—Well, I admit that these are practical propositions, and surprising as they are, I must also admit that you have advanced more evidence for their truth and validity than I should have thought possible. May I now ask if your experience bears out what you say?

M.A. 119.—Certainly, it does. Doctors, of course, do not cure anything. It is nature that cures.

"Medicus Curat Natura Sanat": The doctor puts patients into the position for cure; but nature cures them. But speaking conventionally, I have been able over and over again to cure both of these seemingly opposite conditions by these means.

I. 120.—How long does it generally take to effect the cure?

M.A. 120.—Well, obviously one has to beg patients to persevere for some time; but generally one can get visible approach to cure in, say, six weeks' treatment. Of course, the patient would be very unwise to return to the former way of living after recovering; for if he or she does so they must expect to begin to suffer again in the way in which they formerly did. To remain well we must institute a new way of living and we must continue in it.

I. 121.—I have often heard constipation spoken of as atony of the bowels. I seem to be a little confused by your description; but do you think that constipation is due to atony?

M.A. 121.—No; it very seldom is. It is far oftener due to the reverse of atony, for the condition of the transverse elements of the intestine is more truly described as over-action or spasm than as atony or inaction.

I. 122.—Yes, but there is inaction of the bowel, is there not? Is not constipation fairly termed inaction? And is not inaction atony?

M.A. 122.—Yes; constipation is no doubt inaction of the bowel; but if you think of it you will see that the inaction is not due to atony, but to the reverse, namely, over-action of the transverse elements which contract or act so tightly as to allow nothing or very little to pass. The condition is one of inaction, no doubt, or of diminished action; but the inaction or diminished action is not due to inanition or torpor or weakness, but to over-action of the transverse elements of the structure. It is inaction from excess of action. This is often termed by doctors *inhibition*.

I. 123.—Then do I gather that your definition of inhibition would be that it is inaction or lessened action through excess of action?

M.A. 123.—Yes, that is exactly what I mean. And I should further define *inanition* as inaction due to atony.

I. 124.—That is very interesting. I have never thought of things in this way before.

M.A. 124.—Yes; the animal machine and the human machine are really very interestingly and even complexly made, and the student is constantly finding new causes for surprise in his inquiry into their modes of action. But I hope that it is now becoming clearer to you that it is impossible to do more than palliate either chronic constipation by purgatives or aperients; or on the other hand, to cure chronic diarrhœa by the use of astringents.

I. 125.—Well, yes, I begin to see.

M.A. 125.—I am glad you do, for I think it must be admitted that the study is a little intricate and not quite easy to understand. Here I should like to add that while the theoretical mode of the construction of the animal machine is, so to say, by the introduction of transverse and longitudinal elements, and their alternate contractions and relaxations, the study is complicated by the introduction of a further fact that the life-force does not act in quite so simple a way as this.

I. 126.—To what do you refer ?

M.A. 126.—I mean this : that we find not only cross and long fibres or elements introduced into animal structures, but also elements that may be called pan-hodic or omnivadent, for they pass and they also function in all directions at once and simultaneously. There is really, therefore, a good deal of difficulty in following the way in which the animal machine acts.

I. 127.—Yes, I see that there must be. But is it not the case that aperients are very largely used by the medical profession ?

M.A. 127.—Yes, it is said that some eighty tons of aperient pills are used in England annually ; also that no permanent effect in the cure of the national constipation is yet apparent ; for the use of them still continues, with the frequent suggestion and introduction of new ones.

I. 128.—Do you think that these facts shew insight on the part of doctors into the way in which the bodily machine works ?

M.A. 128.—Well, I must leave you to judge.

FUNCTIONS THROUGH CONNECTIONS—PROPERTIES THROUGH STRUCTURE

I. 129.—What do you suppose is the reason for the introduction of the omnivadent or pan-hodic elements ?

M.A. 129.—Their introduction seems to be necessary as life becomes more and more complicated and intricate and refined, in order that the life impulses may pass without hindrance in all directions. And here we should remember that while the *properties* of structures are related to their constitution or mode of construction, the *functions* exercised through the structures depend mainly on their connections.

I. 130.—What do you mean by that?

M.A. 130.—The question becomes intricate, but I will take a simple case. Cells like blood cells or lymph corpuscles seem to be quite insensitive. They swell and shrink, no doubt, as we can see under microscopic examination, but we are quite unconscious of the movements. The movements may be said to be kytic, or cellular, but are unfelt by the organism in which they live. But whenever two connective tissue cells or two or more nerve cells are joined by bands of connective tissue, then sensibility begins, and we begin to feel that we are alive. Before the junctions the cells were alive, no doubt; but they had no idea of it, or no idea to that effect was manifested through the structure. But whenever union was effected, sensibility began to be manifested, so that the organism began to feel that it was one. This feeling of unity might be considered to be the beginning of personality. Now the swelling and shrinking went on before, being dependent on or related to the constitution of the cells before they were joined up with one another; but not until junction was effected did any commencement of sensibility begin to be felt. That is what I mean by saying that the *properties* of structures are related to their constitution, while their *functions* are related to and are co-ordinate with their connections. Still, fundamentally and theoretically, so to say, the life-force builds up her structure of longitudinal and transverse elements; and although she soon introduces oblique and omnivadent elements also, along which impulses pass, still she seems fundamentally or theoretically to remember always her transverse and longitudinal elements, and to maintain her original plan of making the alternate contraction first of the one and then of the other, the mode in which her processes are conducted. This is the reason in the constitution of things for that ebb and flow, fall and rise, expiration and inspiration, vanishing and reproduction that so characterise life, and make us feel its similarity in change and its change in similarity, making our Eastern friends speak of the inspiration and expiration of Brahm. All things flow. Yes; but in a purposive manner for the elevation and improvement of the mechanism through which life is manifested; and while all things, lower and higher, take part in the movement, it is for those who have understanding through junction or connection of their cells; it is for them to do voluntarily what their inferior co-operators do automatically, in order that the purposes of nature for the elevation of life may be sooner accomplished. The lower individually and automatically and ignorantly, because unconnected or un-unified, perform their part. The intelligent, made so by connection and co-operation, may perform their part voluntarily and may co-operate—or may combine to hinder. For observe as the electric current appears to pass both to and fro along wires at the same time, so life impulses may pass not only ubiquitously along omnivadent or pan-hodic fibres, but even in to and fro directions along each of these strands or elements at the same time.

I. 131.—The body is a much more complicated machine than I thought it.

M.A. 131.—Yes, it seems to be so.

I. 132.—You seem to have established the paradoxes acting in life more thoroughly than I should have thought possible. Have you anything further to say about the same causes producing opposite states and about opposite causes producing the same states ?

M.A. 132.—Yes, I have, and it is this : that the greatest paradox that arises in life is this. Some writers say, and they are right, that there is an eternal and unbridgeable separation between right and wrong. Still, right and wrong merge into one another by gradations so insensible that it is impossible to say where right ends and wrong begins, i.e., right and wrong are contraries, whereas they are also contradictories, i.e., the one is for ever opposed to the other. So the paradox of paradoxes is that right and wrong are both contradictory and contrary the one to the other ; and the solution of this paradox, though seeming impossible, has yet to be effected somehow by every person passing through life.

I. 133.—Can you offer any solution ?

M.A. 133.—Yes, I think the solution may be effected by realising that the test of right and wrong is that right improves the higher life and wrong damages it. I say the higher life ; not all life ; for parasitic or lower life seeks only its own benefit and that always in a narrow and mean way, while higher life seeks rather the benefit of the whole and is ready even to be sacrificed if that benefit can so be accomplished.

I. 134.—I am afraid that you and I can never agree. You seem continually to introduce ethical and spiritual considerations into the consideration of health, while I feel that they ought to be kept out.

M.A. 134.—I have already said that they cannot be kept out. To keep them out is to deprive Nature of Life and of the only thing worth preserving, namely, her constant appeal to the judgment and conscience of the creatures she is procreating.

ACUTE AND CHRONIC DISEASES

I. 135.—You speak, I notice, of chronic constipation and chronic diarrhœa. What do you mean by "chronic"? Do you mean incurable?

M.A. 135.—No. Chronic is derived from a Greek word meaning time; and a chronic disease merely means one that has lasted for some time; and I would suggest, say, three months as a reasonable time for which to apply the term. If a condition lasts for a shorter time than this, I should call it short, which is, of course, the logical opposite or contrary of long. Hippocrates, indeed, divides diseases into chronic or poly-chronic, as he sometimes calls them, and short, or brachy-chronic, and of the latter he said that a judging—or as we now call it, a critical—day arrived in their course at about the fourteenth day, so that he has by some been thought to mean that an acute disease is one which lasts for fourteen days. He does not seem to have meant this; but even if he did, we have better means of measuring the severity of a disease than existed in his day or in that of any of the ancient writers on medicine. We may define acute diseases, which are evidently opposed in logic, not to chronic, but to mild, by saying that acute diseases are those in which the temperature rises to 103 or 104 degrees F. with usually a corresponding pulse-rate of, say, 120 or 130; while mild diseases may be defined as those in which the temperature does not rise above 100 degrees F. nor the pulse-rate above 100 or so. Obviously there is an intermediate set of conditions in which the temperature ranges from, say, 100 degrees F. to 102.5 degrees F. or 103 degrees F. and the pulse rate from 100 to 120: and these we may term sub-acute. If the temperature is above 104 or the pulse-rate above 130, the condition may be called per-acute; and if below 100 degrees F. or 100 pulse-rate, the disease may be termed mild.

I. 136.—I understand that Hippocrates divided diseases logically and practically into severe and mild, and into long and short, and that it was not till long after his time that the illogical confusion between acute and chronic was introduced?

M.A. 136.—Yes. It was introduced by Ascelepiades of Prusa, who was not really a doctor, though he gave medical advice, and among others to Cicero, who was attracted to him by his philosophical speculations. There is, of course, a practical side to this question also, for if a disease is acute or per-acute, it stands to reason that it can not go on for a very long time without killing the patient, and as the patient must either recover or die, perhaps this is the reason why a classification which was really a retrogression has held sway for so long a time, and is even now so difficult to displace.

IMPORTANCE OF NUTRITION

He, therefore, who would have health and life without doubt must strive to understand nutrition, which is sometimes called metabolism, and is divided into the two phases of anabolism or building up the stuff of the body, and catabolism, or the breaking down of the same. But not only must he understand nutrition, he must also adapt his conduct, that is, his mode of life, to his understanding of the subject, and if he does not do so he must perish, or at least, his body must die or part with its human life much sooner than it ought to do.

I. 137.—What do you mean by that ?

M.A. 137.—I mean particularly this, that if more food is ingested into the body than is necessary for the restoration of the waste of the body it must block and choke the body up, and so must tend to bring on it disease and death before its time and therefore we must on no account take more food than is enough for that purpose, even although sometimes the pleasantness of appetite and of the palate may tempt us to do so.

I. 138.—You seem, then, to imply that it is a temptation to take more than enough and that we are called upon more or less continually to resist this temptation.

M.A. 138.—Yes, that is exactly my meaning.

I. 139.—Do you think that there is no danger of our not taking enough food and that our fears of starvation are vain or unnecessary ?

M.A. 139.—Well, of course, we must have enough or we cannot go on living but taking too little where people have food set before them is almost a negligible vice and in fact very rarely happens : while the danger of taking more than we require is so constantly pressing on us that we far oftener eat and drink too often and too much than too little or too seldom.

I. 140.—Do you never then see disease or death occur from starvation or inanition ?

M.A.140.—From direct starvation or inanition seldom : From indirect starvation or inanition very often.

I. 141.—What do you mean by this distinction ?

M.A. 141.—By direct starvation or inanition I mean the attempt, deliberate or other on the part of a healthy person, to take less food than he requires to restore his body waste. That is very seldom seen. So seldom as to be negligible.

I. 142.—Indirect starvation then is much commoner? Will you say what you mean by that?

M.A.142.—Yes. Many of us, in fact I think the majority of us, have our bodies blocked by taking too much food and taking it too often: and nature's cure for that is usually a feverish attack of some kind, either a feverish cold, or a fever with a name like typhoid or smallpox or influenza; or in children scarlatina or measles, whooping cough or mumps and the like. But in other cases and as life goes on, in much the larger number of cases the body gets blocked slowly and even very slowly and insidiously. And then gradually appetite falls off: and finding this so and believing as most of us do that we ought to eat more because our appetite is failing we do so, and often indeed stimulate appetite by condiments and wine, and various other devices; whereas what we ought to have done is to have diminished the number of our meals and the quantity of food taken at each of them, in order that the body might be able slowly to overcome its difficulties by throwing out and so relieving itself of the waste stuffs accumulated in it, and so of returning to the normal of health; but if we do not do this, but on the contrary try to stimulate the palate and appetite under the fear that our strength will run down, then the body often refuses food altogether, and we die of indirect starvation: that is from starvation in the midst of plenty. This is not an infrequent termination of life and is in fact more common than death from direct inanition, being in fact death due (if indirectly) not to too little food but to too much food taken too often and generally for years.

I. 143.—Have you any other name for eating too often and too much?

M.A. 143.—Yes. I call eating too often pollaki-siteism: and eating too much I call poly-siteism.

I. 144.—What do you call drinking too much and too often?

M.A. 144.—I call drinking too much poly-potism and drinking too often I call pollaki-potism. These are longish words, but it is sometimes convenient to use them, also they are shorter than such phrases as eating or drinking too often.

I. 145.—Then you say that death far oftener occurs from indirect pollaki-siteism and poly-siteism than from direct forms of these conditions?

M.A.145.—Yes that is what I mean. I have seen and every doctor has seen over and over again patients go to bed and finding themselves unable to eat anything and even (though perhaps less often) to drink anything, simply refuse every form of sustenance and die in the course of some days or in a few weeks with a dry mouth and labouring breath and failing heart. This condition while it may be the natural termination of life is frequently brought on earlier than it need be, because the patients have persistently for years taken, if unawarely, more than was good or necessary for them and so have died before their time.

I. 146.—How do you account then for the fact that many doctors recommend what they call free and generous feeding and even drinking, while others recommend taking very little?

M.A. 146.—The answer is that the former have often failed to see that there can be and often is wasting and attenuation from taking too much as well as from taking too little, and that in fact the cause is oftener the former than the latter.

I. 147.—Then you think there may be some justification for the practice of what is called the starving doctor?

M.A. 147.—Yes; but this subject has already been dealt with in question 25 and the following one and therefore need not be enlarged on now.

BODY HEAT AND FOOD

I. 148.—You do not seem to think that body heat is caused by the food, although I understood you to say that the life-force arranges if *unawarely to* itself, or without quite knowing what it is doing, or why it is doing it, for the formation in the liver and muscles of the compound called glycogen, whose oxydation slowly liberates heat to maintain the temperature of the body at 98½ degrees F.; and that unless this were done the body would not be a fit habitation for the life-force nor be a fit instrument for the doing of work.

M.A. 148.—Yes, that is my view.

I. 149.—Are you not somewhat singular in your opinion? Do many doctors agree with you?

M.A. 149.—I think that more members of the profession might be said to be taking this view now than was formerly the case; but some of them still seem to believe that the animal heat is not only maintained by food but is also caused by it.

I. 150.—Could you say in a sentence or two why you think that food is not the cause of the heat of the animal body?

M.A. 150.—Yes; but I think I ought first to ask you if you think that coal or wood or oil is the cause of the heat of the stove of the steam engine or of the petrol engine?

I. 151.—Why, of course I do, because if no coal or wood or petrol was consumed in the fireplace there would be no heat from the fire. I am surprised that you should ask me such a question.

M.A. 151.—Well, I am serious, as I will show you by asking this question: Can fire burn in a vacuum?

I. 152.—No; but what bearing has that question on the one whether food is the cause of the heat of the body?

M.A. 152.—Much, every way. Let me ask you: Suppose that in place of having to pay for our wood or coal or petrol which we use in the fireplace to raise heat—suppose we had to pay for the air, without which or without the oxygen of which no fire will burn, and had got our coal for nothing. Don't you think that we should all believe that the air or the oxygen was the cause of the heat, and should we not have said it evidently must be so because without air or oxygen we could have no heat?

I. 153.—Yes, I suppose we should; but do you mean that neither the coal nor the oxygen is the cause of the heat in the fireplace or in the steam engine?

M.A. 153.—Yes; that is just what I do mean, and I think that chemical energy, being warm, as all active or kinetic energy is, the cause of the heat of the fireplace is that when C. (from the fuel) and O. (from the air) come together, chemical energy is liberated and causes the fireplace to become hot at the same time as it wastes the C. and the O. The latter we do not notice as we have not to pay for it; but if we had to pay for it as we have now to pay for the fuel, we should attribute the heat of the fire to the O., because we should have argued that there would be no heat unless O. was supplied.

I. 154.—Well, I have not thought of things in this way before, and I begin to see that you may be right in attributing the heat neither to the carbon nor to the oxygen but to the chemical energy which combines the two and so liberates the heat. But do you think that coal behaves in the fireplace as food does in the body ?

M.A. 154.—I was going to ask you that question, but since you have asked me, I will reply yes and no. Food gives off CO_2 in the body, and the lungs appear to have been interpolated in the process of the digestion of food in the body, partly for the purpose of getting rid, as by a chimney, of the CO_2 and other gases formed in the course of digestion ; and nature's purpose, if unaware purpose, seems indicated by the fact that the life force develops the lungs from the digestive tract where the CO_2 is formed ; but there are great differences between the formation of the CO_2 in the fireplace and its formation in the digestive tract.

I. 155.—What are these differences ?

M.A. 155.—First this great difference is that whereas there is a great, even immense, difference of temperature when coal is burned in a furnace and CO_2 is given off, when CO_2 is given off in the body, there is no difference of temperature at all. When food is consumed in the body and converted into body stuff, this change takes place at the temperature of the body, i.e., at about 98½ degrees F. As there is no elevation of heat at all, don't you think that this is a very striking difference—only 98.4 degrees F. in the one case and many hundreds of degrees and even thousand of degrees of difference in the other ?

I. 156.—Well, yes ; but what other differences are there ? You said there were many. Do you mean to suggest to me that when I feel warmer when, being cold and hungry I take food into me, I am under a delusion ?

M.A. 156.—Well, yes, to a great extent. You will admit, I suppose, that the best way to answer that question is to take the temperature of the body before and after eating? Well, if you do that you will find that either there is no increase of temperature at all, or that the rise is only a degree or so and therefore negligible. That the feeling of warmth is felt, I admit.

I. 157.—What other differences are there?

M.A. 157.—Would you not think that there is a great difference in this, that the life-force which procreates the body lives in it till death, while the maker of the artificial machine does not do so, but has to be sent for to repair any damage, while the body makes its own repairs?

I. 158.—Yes; but what other differences are there?

M.A. 158.—Does fuel become part and parcel of the fireplace? But as food must first be assimilated by the digestive processes and become part and parcel of the body before it is used, would you not say that this also is a great difference?

I. 159.—Any more differences?

M.A. 159.—In order to find some analogy to the heat of the body different from that of the heat of the fireplace or the engine, I ask you to make this experiment. Physicists have already made it, and they say that if you have two copper wires similar and similarly situated they have the same temperature, but that if you send an electric current along one of them, the wire along which the current is passing becomes warmer than the wire along which no current is passing. What warms the wire?

I. 160.—The electric current, I suppose.

M.A. 160.—Right again. Then do you not think that I may be right in saying that probably the life-force being warm warms the body?

I. 161.—Well, that is not so unreasonable as one would suppose.

M.A. 161.—We saw before that it is a scientific commonplace that " of origins we know nothing," but I begin to ask if I have not shown some probability for my suggestion that the active powers of the universe, the chemical Energy, the electric E, and life E, and perhaps even the gravitational E, are intrinsically warm, and that as these forms of energy are varieties of Pan-mono-dynamic, and that as Pan-mono-dynamic must come from a source adequate to account for it, that perhaps that source may be intrinsically warm, and that perhaps the fact may indicate that heat or warmth, or love, is equally a quality of that Source which is the reason for the creation of the universe. And I would make the further suggestion that as all kinetic energy is not only warm but luminous, perhaps the luminosity may represent or suggest to us the wisdom, while the warmth stands as a suggestion of the love with which this scheme of things to which we belong is being conducted ?

I. 162.—There you are again, always introducing considerations which are not only confusing in themselves but outside of the science of health with which alone I imagined we should be concerned when I asked you for a definition of health.

M.A. 162.—Well, but surely it is a fact that the body is warm, and therefore that fact comes within the province of science ; and if that fact has an ethical or spiritual meaning, why do you wish me to refuse to ask a question and see if we cannot get some answer to it ?

I. 163.—Then you think you have established some great differences between the working of the animal machine made by nature and the artificial machine made by man, and first, that the animal machine is living while the artificial is not, or at least is not by any means so much alive ?

2. That the maker or procreator of the animal

body, that is, the life-force, lives in it, while the maker of the artificial machines does not;

3. That food differs from fuel in this, that fuel does not become part and parcel of the fireplace and would, in fact, choke up the machine and render it useless if it did, while food must become part and parcel of the body before it is used to restore the body-waste;

4. That while fuel combustion is accompanied by a largely increased amount of heat measured by hundreds and even thousands of degrees, there is no change at all, or next to none when food is incorporated into the body;

5. That as the electric current seems to be intrinsically warm so that its passage makes a wire along which it is passing warmer than a similar wire along which no current is passing, perhaps the life-force warms the body.

Well, I will think about these points and see if I agree with you.

M.A. 163.—I shall be glad if you will; and I shall be glad if you will also take into consideration this fact, that in fifty or more years' experience of medical practice, doctors do not see more variations of bodily heat among persons living in arctic cold or tropical heat or in the temperate regions of the earth, than, say, from 92 degrees F. up to 107 degrees F. or so, and when you have thought of it say if you do not think that this affords further reason for the suggestion that the life-force is intrinsically warm. And further still, perhaps you may think that nature may not be so much influenced by prevailing views as to food uses in the body as we seem to think, since she has provided sugar and cocoanut oil and palm oil in the tropics in abundance as food; and olive oil in the warm temperate regions of the earth, as well as blubber to keep the dwellers in arctic seas warm; while if we think only of the heat-giving functions of sugar and fats, we might have expected that the supply would have been only in the colder regions where, according to our notions, they are so much more wanted or required?

I. 164.—Has not some scientific man said that when too much food is taken into the body it is apt to burn up the body as too much heat in the fire-grate burns up the boiler flues?

M.A. 164.—Yes. He was an eminent scientific authority, though not a doctor.

I. 165.—Do you think that he was right?

M.A. 165.—No, I do not.

I. 166.—He was a much greater authority than you. Do you think it is modest to set up your opinion against his?

M.A. 166.—I can only judge by the evidence, and the evidence shows that there is little or no elevation of heat produced in the body when too much food is taken. On the contrary, the bodily heat often falls when this cause is in action. It is very common indeed for persons in advanced life, I mean to say over fifty years of age, to wake with a sub-normal temperature of 95 or 96 degrees F. or even sometimes lower than 94 degrees F., and this because they have put into their bodies more food than was necessary to restore its waste. If the temperature falls, how can you speak of the body being burned up as boiler flues are by too much heat? But if the heat of the body did rise, we have already seen that the increase is very little and almost negligible.

I. 167.—But surely you admit that it is bad to take too much food.

M.A. 167.—Of course I do. To say so is my main thesis, but the harmfulness of taking too much food is due not to over-combustion but to such blocking or choking of the blood—and lymph—circulation as prevents the beautifully made animal machine being a fit instrument for its work. This is not caused by over-combustion, but the reverse.

I. 168.—Then you set up your opinion against that of a man very much greater than you ?

M.A. 168.—I am sorry, but I think he was wrong, and I have given my reasons. You should ask, Are the reasons convincing ? not, Who adduces them ?

I. 169.—Well, you do seem to advance more reason for your dissent than I thought possible.

M.A. 169.—Are you convinced ?

I. 170.—I will think it over. But do you not think that there are experts in opinion with whom it is dangerous to differ ?

M.A. 170.—Of course I do ; but surely their views must bear examination if they are to be accepted. And I have observed that one of the marks of great men is to admit error when error is pointed out, because great men are more anxious to find out the truth than to aggrandise themselves or to prove their authority.

EXCITING AND PRE-DISPOSING CAUSES OF DISEASE

I. 171.—I have heard that doctors divide the causes of disease into two—the exciting causes and the pre-disposing causes. Have you anything to say about this ?

M.A. 171.—Yes. There seem to be a good many things to say, as, for example, that causation as it is related to origins and as it is a commonplace of science to say that of origins we know nothing, obviously the inquiry into causes is one of some difficulty. But we ought to keep in mind that medicine deals with conditions or states of the body, while causation in general usually deals with things rather than with states or conditions. Thus, when the ancient Greeks dealt with the causes of a thing like a chair or a table or a ship, they said that the causes were four: namely, the material, efficient, the formal and the final. Of a chair, a table, or ship, the material causes would be the material or stuff, the wood or the metal of which each of the things is made. The efficient cause would be the workman who made or built it. The formal cause would be the idea which the builder or artificer had in his mind, the kind of thing he wanted so to say. And the final, or teleological cause, would be the end or purpose for which the thing was intended, as to sit upon, to lay things on, to sail the sea. This was a very subtle and even full account of causes as applicable to things. But the causes of states or conditions of body are different and can hardly be so fully dealt with. So we say that such and such causes are those which induce a state of disease; but that depends to a great extent on the state of the body or organism that suffers from the disease, as we have seen already in considering the incidence of the infectious diseases when we thought we discovered contributory negligence on the part of those attacked by them. To some extent similar reflections arise when we try to account for disease in general, for undoubtedly we shall not be so liable to the incidence of disease, infectious or other, if we are in a healthy condition as if we are in an unhealthy condition. As this is determined by our previous management of ourselves, and as that is a matter which is in our own hands, if we are in an unhealthy state and are so more ready to succumb to causes like the weather, the cold or heat, or rain, or fatigue, this readiness being our own fault may be viewed, as in the case of the infectious diseases as a case of contributory negligence on our part. The state of our constitution at the time of the attack is certainly an affair to some extent within our own power or management, and if we did not manage ourselves properly, it can hardly be contended that we are not to blame for being ill. The pre-disposing causes of illness are, therefore, the state of the constitution at the time of the attack; and this state depends more upon the state of the nutrition than on anything else; or nutrition turns out once more to be fundamental in considering the incidence of disease.

The exciting causes are, as have been hinted at already, cold, heat, fatigue, wind, rain and other causes attributed to the weather which are still and probably always will remain outside of our own control. Accidents also may be outside of our control, for others may accidentally collide with us and we *may* be free from blame. But even if we fall and break a leg by accident, the amount of suffering which we sustain by the accident and the length of time that we suffer will both vary very much, not only according to the severity of the injury, or of the violence of the wind, rain, cold or fatigue, all of which may be to a great extent out of our control, but also according to, or inversely as, the soundness of our constitution at the time of our illness, whatever it was. On the other hand if a man falls into a white hot furnace the most diseased man and the most healthy will frizzle up in practically equal time, so that no predisposition can modify the effect of such an accident as that. These, then are the exciting and the predisposing causes of illness, the former of which are very little within our own control, while the latter are so to a greater or lesser extent.

I. 172.—Thanks. I think you have dealt fully with these, and have not failed to point out after your manner wherein even as regards ordinary illness you consider that the responsibility often lies. Would you say that a person would ever be justified in saying that he would be ashamed to have, say, influenza or other disease ?

M.A. 172.—Well, yes, I think we ought to be able to go so far as this—although of course it is a strong thing to say. Certainly if I got pneumonia or influenza I should feel ashamed of the fact.

THROWING OFF OF WASTE MATTERS

I. 173.—Well, I only wanted to know. Thanks. I have been thinking that I should like to hear something of the arrangement made by human nature or man-life, as you call it, for eliminating waste matters. Are there any other methods except that of absorption into the lymph-stream and so getting rid of waste matters out of the body without entering the lymph-stream ?

M.A. 173.—Yes, there are some widespread places, namely, the skin, and also the interior mucous surfaces by means of which waste matters are exfoliated, or thrown off the surfaces of the body without entering the lymph-stream and so running the risk of poisoning the body. It has occurred to me that if it were possible to cause growths such as cancer to be exfoliated as the epithelium is exfoliated from the skin or as excretions are thrown off from the mucous surfaces of the body, there might be some hope of a natural cure of such growths. I once thought that if cancer could be converted into abscess it might be got rid of, as an abscess or a carbuncle can be healed. But I have seen such a condition in which abscess after abscess formed and the dead stuff was thrown off or exfoliated and yet the disease went on relentlessly, if intermittently, to its fatal termination. So that I have come to the conclusion that the only really hopeful method of dealing with these terrible conditions is to concentrate on their causation, and as that seems to be entirely or almost entirely a question of nutrition; assimilation or nutrition, or in plain words, diet, or eating and drinking, seems to be the beginning, the middle and the end of the question of Health. It may occur to the inquirer also to reflect that if health like all other forms of life may not be reached by the direct individual effort of each person, help may be obtained to this end by asking for it from the Source of Life.

Of course, no mere operation for removal of a cancerous growth can be expected to result in cure, i.e., in non-recurrence, except by accident. On the other hand, free removal with the emphatic advice to live for the future in such a way as to prevent the causes of the former condition from acting again, may be of the most hopeful efficacy in obtaining permanent cure.

CONCLUSION

I. 174.—What, then, do you think that you have shewn by this long series of question and answer?

M.A. 174.—I think that I have shewn evidence for the truth of these propositions.

I. That pan-mono-dynamic or Nature is a going concern for the procreation, development, improvement and even perfecting of life, and that death is only an incident in this progress; that Nature is not a concern of death but of life.

II. That Nature, although possessing what seems to us her children (for we are a part of Nature) powers that are infinite and irresistible, uses these powers with qualification and restraint, producing not destruction, but orderly rotation and harmony, kosmos rather than chaos.

III. That pan-mono-dynamic, or Nature, being infinite, omnipotent and eternal, and acting as if it knows and as if it is considerate and merciful, and as if it repented it of the evil, must have a Source adequate to account for it, and therefore that that Source must be infinite, omnipotent, eternal, all-knowing and all-merciful, otherwise that pan-mono-dynamic or Nature is the manifestation of the mind and will of God.

IV. That the Life-power is always striving to express itself in forms suitable for it ; and so, as it comes from an infinite source, it consists of an infinite variety of forces or powers, and so each of these forces pro-creates each a body suitable for its manifestation or expression. These are hylo-dynamic, or the power of substance or gravitation, chemico-dynamic, electro-dynamic, bio-dynamic, which soon seems to divide into phyto-dynamic or the power of plant-life, and zoo-dynamic, or the power of animal life. They also include, no doubt, many other powers or forces of which we have little or no knowledge, but which are in course of revealing themselves to us as our powers and capacities increase, but which will continue to pursue the same paths as those taken by those forces that we already know. And as it has been in the past, so no doubt will it be in the future, the revelation will be line upon line, precept upon precept, here a little, there a little, as our powers (or our successors' powers) increase and as we are able to bear it.

Some of these unknown forces may perhaps be termed Heuretico-dynamic or the Finding Forces.

V. It is remarkable that attraction or drawing together seems to be the fundamental quality manifested by pan-mono-dynamic, as if the intention was and is to shew us that drawing together or love is the motive power of the universe in which we live and of which we form a part.

VI. Although Life appears to be an ascent in the sense that lower forms appear earlier than higher ones, as the testimony of the rocks seems to show, still this is not incompatible with the view that Life is really a descent, and that, as each form of Life-force finds an environment ready for it, it descends to occupy the place and circumstances fit for its manifestation and expression ; and so it appears to be an ascent while in fact it is a descent. This suggestion explains how from time to time a mutation occurs, that is, the sudden appearance of an animal form for which the ancestors do not seem to account, or which they do not seem to explain. This again is quite analogous to the apparent suggestion that the sun moves round the earth, while we know that in fact the earth moves round the sun, although we have found it so difficult to believe this that we have actually murdered and burned to death one another for suggesting such an idea.

VII. If pan-mono-dynamic acts thus in an evolving way, it does not seem likely or even possible that Nature will remain as she is at present, and if man seems to be the present culmination of organic evolution it is hardly likely or even possible that man will remain so, for he must be superseded by Life-forms higher than we.

VIII. The way in which higher Life-forms succeed lower ones seems to have been by the lower forms doing their work and duty in the spheres in which they found themselves, the bee for example pursuing its desire for nectar, yielding to impulses which it did not and could not understand, and yet unawarely carrying on its body pollen from one plant to a distant one of the same kind; the effect being a production of a better, fuller fruit than would have arisen from self-fertilisation. The animal then lives on this fruit and is improved in turn.

XI. As however animals ascend in the scale or rather as higher forms of animal life find environments prepared for them by more lowly predecessors, and enter in to inhabit them, the unaware factors and actors may gradually become more aware. We undoubtedly have more knowledge than the bee and we may, if we will, try to do, more or less knowingly, what the bee did and does quite unaawarely, viz, play our part in evolution. Evolution would probably in that case be quickened, and processes which will probably be accomplished whether we help or not, would very likely be much quickened by our voluntary co-operation and our more or less knowing efforts towards the carrying on of the work, as probably also the process will be delayed if we determine to oppose it. At present the opportunity seems open to us, but it may not always remain so. Allowing that humanity is the present culmination of organic evolution, we must be superseded by Life-forms higher than we. We may help or we may hinder, but we can neither achieve nor prevent. Our choice then seems to be or rest with ourselves. Will we help or will we hinder? In either case we must be superseded. But we may if we will, elect to be extinguished as many of our predecessors have been; and it may be that only the record of tubercular, rickety and cancerous bones (all of which are the signs of the self-seeking characters of the Life-forms that formerly occupied them) may remain to shew our successors what manner of men and women we were.

X. The method in which pan-mono-dynamic acts seems to be for the larger and more massive bodies to draw the smaller and less massive ones to rotate around them (not to rush into them and be destroyed) ; for the warmer bodies to part with some of their heat to the cooler ones ; for the more illuminated to part with some of their light to the darker bodies so that there is always a tendency towards equalisation which however is never reached, although it always seems to be approached. And in fact the motive power of the universe seems to be used in this very way, by that which has more always giving to that which has less, and so the universe seems to be moving as a going concern for the procreation, improvement, development and even perfecting of Life. If this tendency to equalisation, which is always going on in the nature of which we are a part, makes its appeal to us, perhaps it is with the intention on the part of the Source of pan-mono-dynamic that we should be stirred to go and do likewise ? and if we are possessed, any of us, of more power than others, that we should also be ready to pass on of our surplus to those that have less ? This is not impossible, and if the impulse were yielded to how much improved would the state of society become. Besides that—

XI. When powers are used for the gratification of lower life in a destructive way, as when carnivorous animals eat one another, do not such animals destroy not only their prey, but themselves ? So that if we gratify our less noble passions and steal, and try to obtain what we can without yielding to the desire to give in turn, do we not also destroy ourselves, or at least damage ourselves as well as those whom we rob ? It must be so.

XII. There is an appeal then from pan-mono-dynamic or from Nature that we should act generously, that as we have received freely we should give generously ; although there is no compulsion. The loss is ours if we do not respond ; but we need not respond unless we will. If, however, we find it difficult to respond, it is open to us to ask for help from the Source of pan-mono-dynamic or of Nature, and that Source is always ready to respond in ways that we know not, being always ready to come into us and to change us from Self-love to true Love which as it was and is the beginning, middle and end of Life seems always anxious to draw us into it ; that Love and Wisdom Warmth and Ilumination may be all in all. Obviously in these circumstances pain and disharmony must disappear, order must reign and death must die.

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